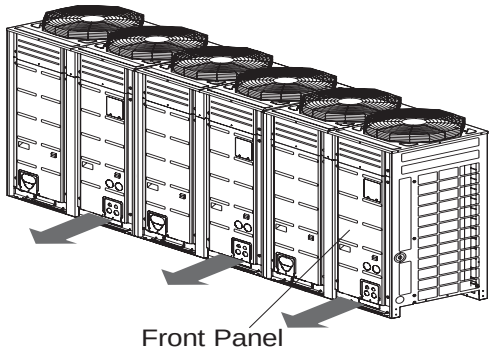
⚠ WARNING

- *All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual.*
- *Undersized wiring may lead to unacceptable voltage at the unit and may cause unit malfunction and be a fire hazard.*
- *Properly ground all outdoor units and indoor units. Ground wiring must always be installed by a qualified technician. Do not connect ground wire to refrigerant, gas, or water piping; to lightening rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide an NEC approved earth ground can result in equipment malfunction, property damage, electric shock, physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent may include some amount of direct current. Using an oversized breaker or fuse may result in equipment malfunction, property damage, electric shock, physical injury or death.*
- *The outdoor units are inverter driven. Do not install a phase-leading capacitor; if installed, it will deteriorate the power factor improvement effect, and may cause the capacitor to generate an abnormal amount of heat.*
- *Verify the power imbalance is no greater than 2% between phases at each outdoor unit frame.*
- *Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.*

Outdoor Unit Wiring / Cable Access Holes and Connections

- Unscrew all of the screws and remove the front panel by pulling it forward.
- Connect the communication cable between the master and slave outdoor units through the terminal block.
- Connect the communication cable between the outdoor unit(s) and indoor units (and heat recovery control units; Heat Recovery Systems only) through the terminal block.

Figure 52: Accessing the Power Wiring and Communication Cable Connections.



Separating Power Wires and Communication Cables

- Position the power wiring a minimum of two (2) inches away from the communication cables to avoid operation problems caused by electrical interference. Do not run both in the same conduit.
- If it is necessary to run the power wiring and communication cable alongside each other and cannot be avoided, table below for minimum recommended distances.

Table 48: Power Wire and Communications Cable Minimum Required Separation Minimum Allowable Distances.

Capacity of Power Supply Wiring (current)		Recommended Minimum Distance[1,2]
100V or more	10A	11-13/16 inches
	50A	19-11/16 inches
	100A	39-3/8 inches
	Exceed 100A	59-1/16 inches

[1]The figures above are based on parallel lengths up to 328 feet long. For lengths in excess of 328 feet, the distances will have to be recalculated in direct proportion to the additional line lengths involved.
[2]If the power supply waveform continues to exhibit some distortion, the space between the power wiring and communication cable should be increased.

⚠ Note:

- *Do not bunch the power wiring and communication cables together.*
- *Do not run the power wiring and the communication cable in the same conduit.*

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Location of Outdoor Unit PCBs and Other Components

Figure 53: Single Frame Outdoor Units.

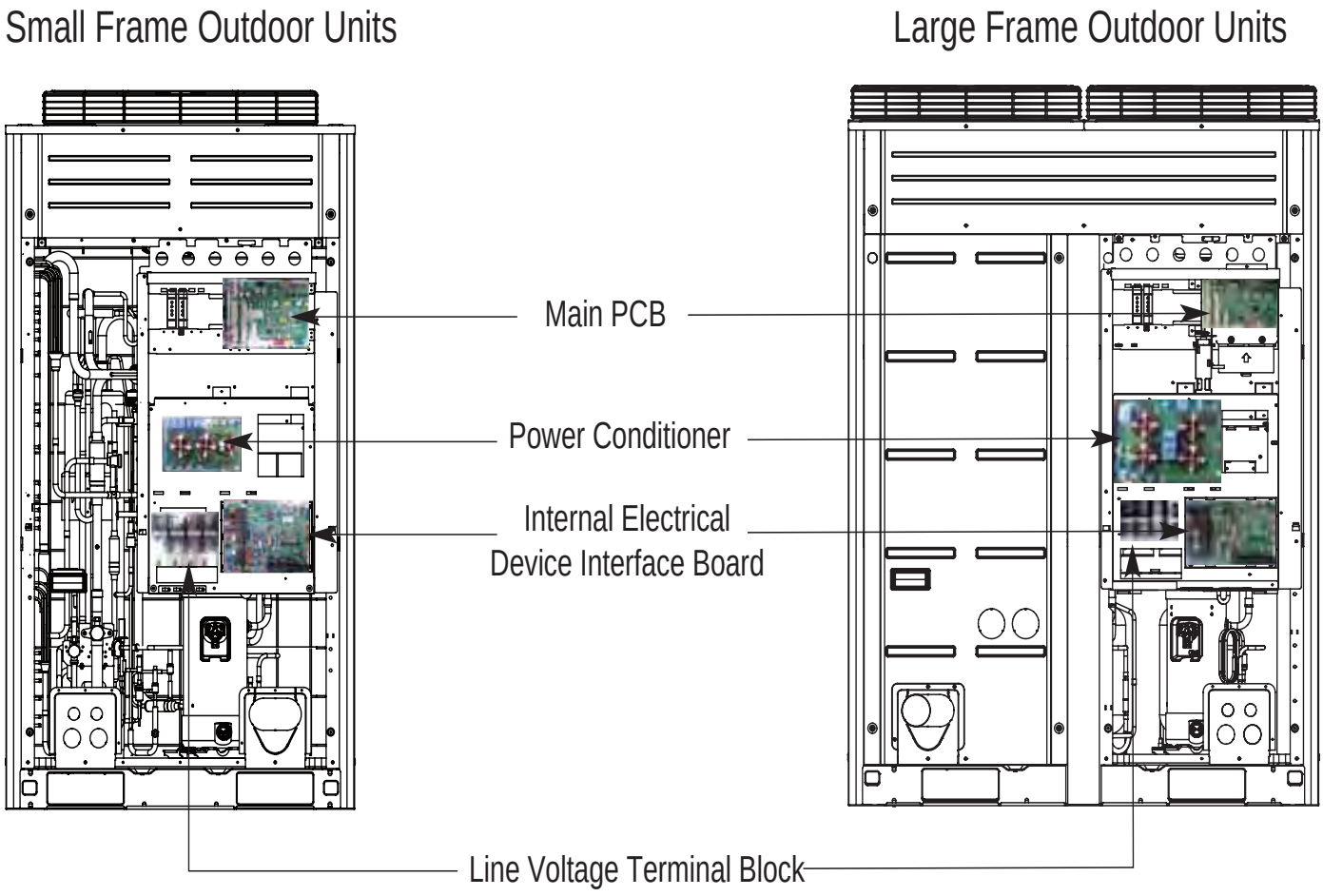

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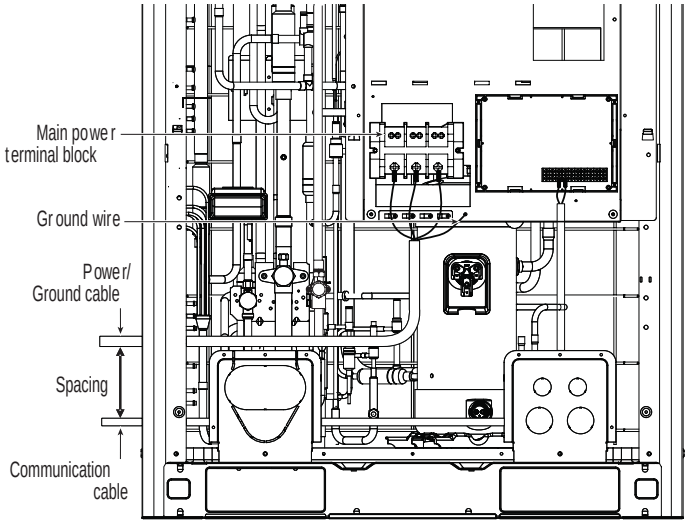
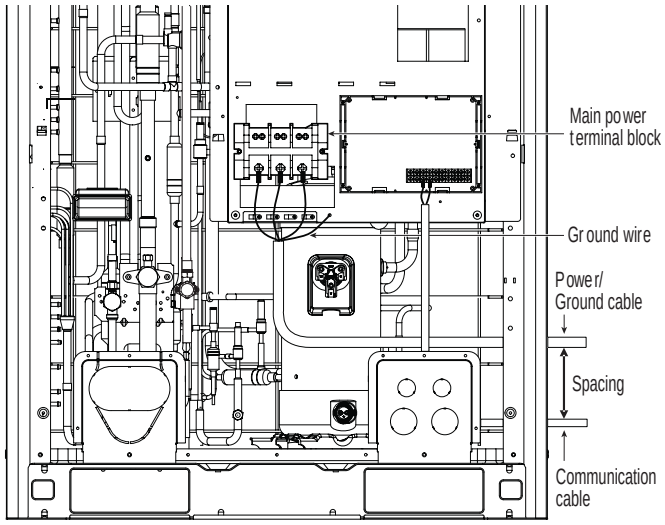
Figure 54: Heat Pump and Heat Recovery 72,000 Btu/h Single Frame Power Wiring and Communication Cable Internal Routing and Terminations.

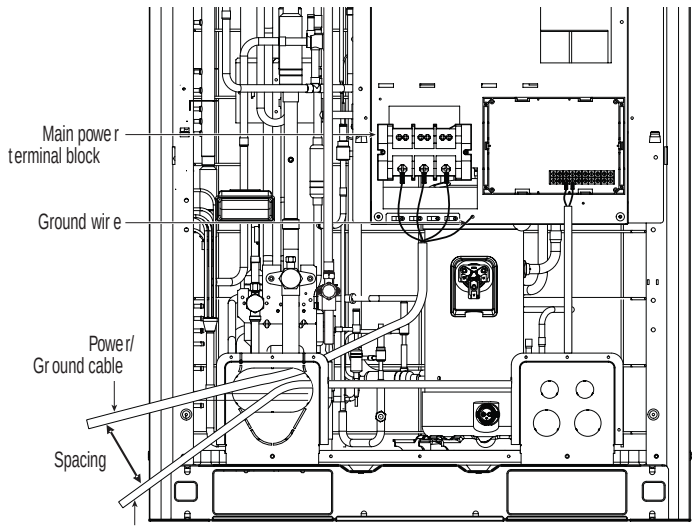
Left End



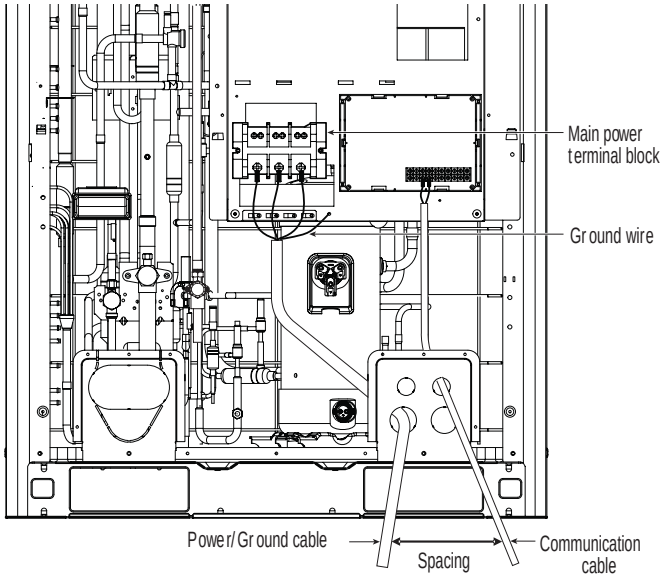
Right End



Front Panel Left



Front Panel Right



⚠ Note:

When connecting the power wiring and communication cables, avoid placing these near the oil level sensor. If placed near the sensor, electromagnetic energy may cause the sensor to malfunction.

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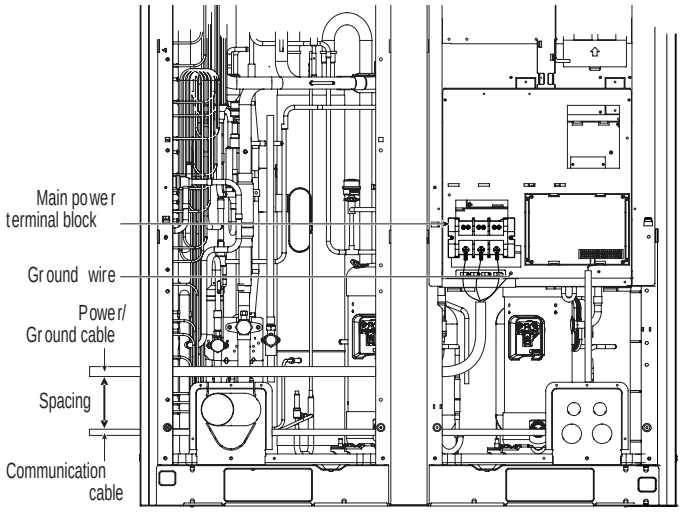
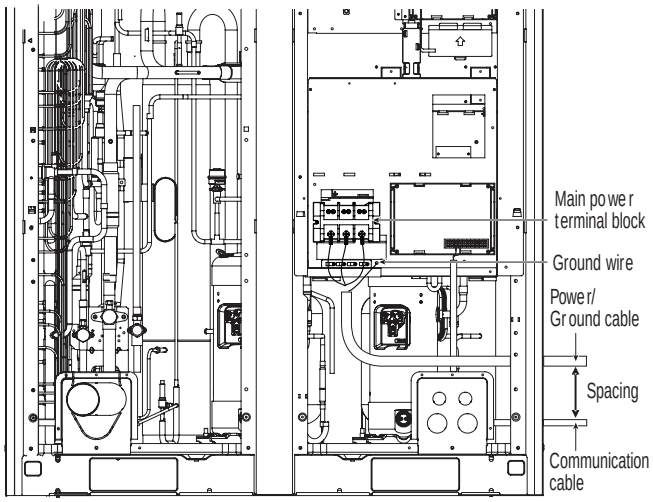
Figure 55: Heat Pump and Heat Recovery 96,000 to 168,000 Btu/h Single Frame Power Wiring and Communication Cable Internal Routing and Terminations.

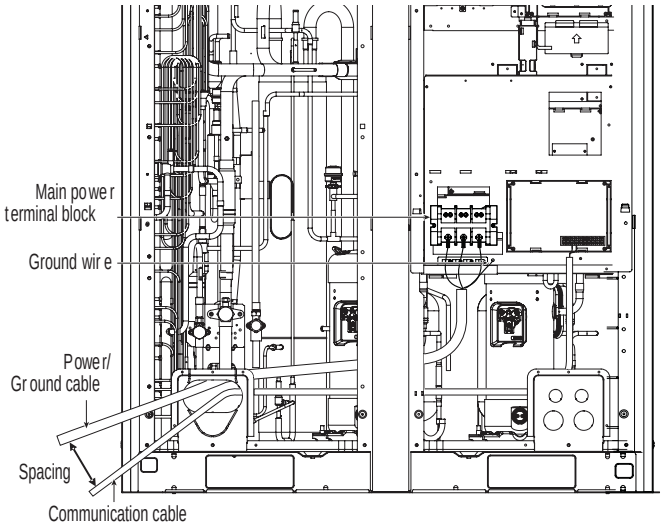
Left End



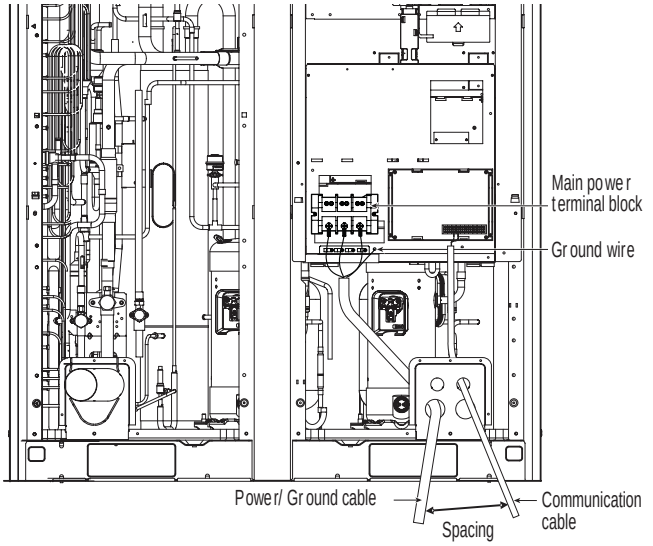
Right End



Front Panel Left



Front Panel Right



⚠ Note:

When connecting the power wiring and communication cables, avoid placing these near the oil level sensor. If placed near the sensor, electromagnetic energy may cause the sensor to malfunction.

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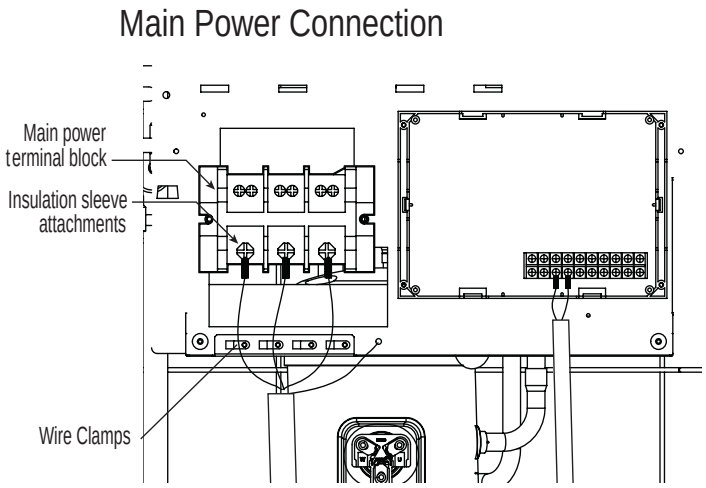
Power Supply / Power Wiring Specifications

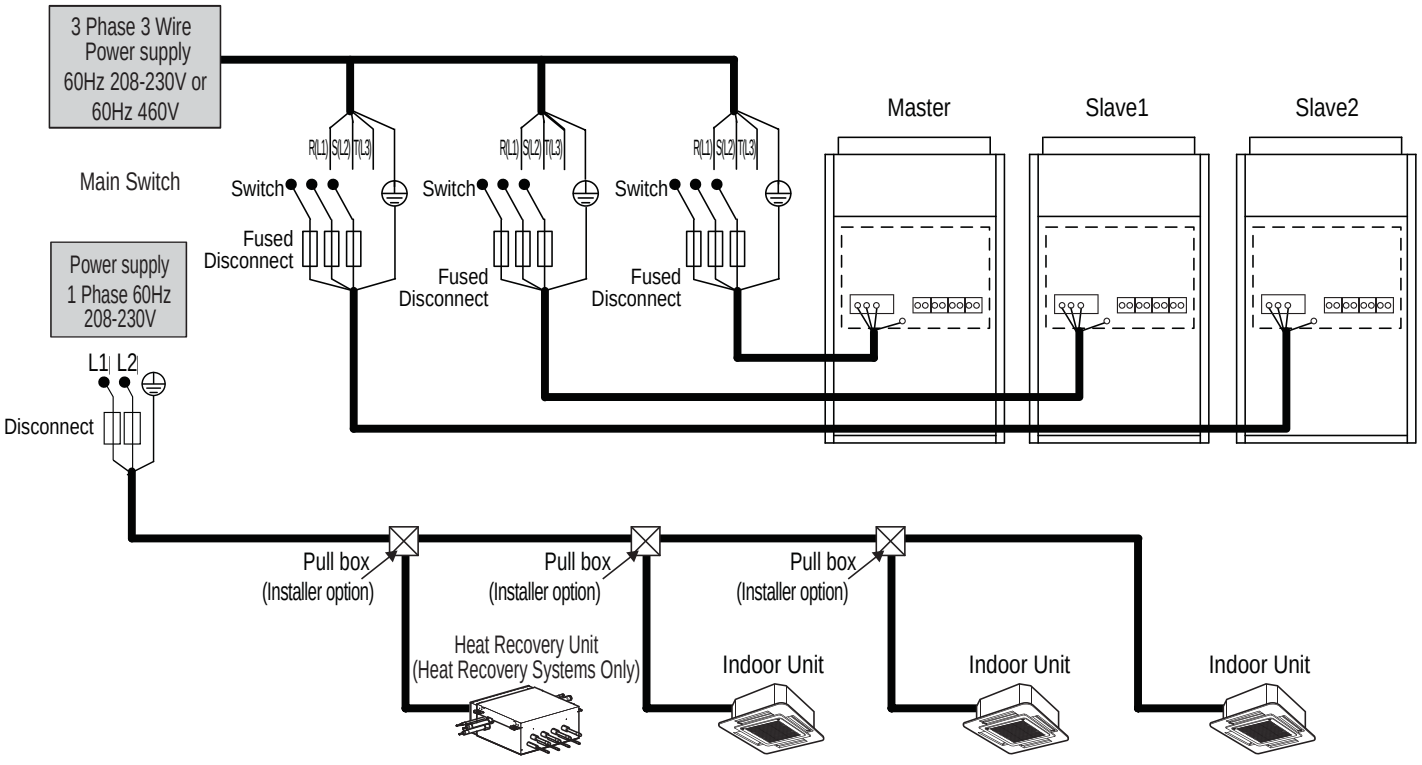
1. Outdoor unit(s) and indoor units must be provided power from separate breakers. Each outdoor unit frame in a multi-frame configuration must be provided a dedicated fused disconnect or breaker:
   - Heat Pump and Heat Recovery Outdoor Units are available in both 3Ø, 208-230V, 60Hz, and 3Ø, 460V, 60Hz. Check the nameplate of each frame, and verify that the voltage of the frame matches the power source provided.
   - Indoor Units and Heat Recovery Units (Heat Recovery Systems Only) require 1Ø, 208-230V, 60Hz power. All Indoor Units and Heat Recovery Units (Heat Recovery System Only) draw minimal power. Where permitted by NEC and local code, multiple Indoor Units may be powered from a single 15A breaker.

Figure 56: Power Wiring Termination Detail. Connect Power Wiring to Terminal Block Using Clamps.



2. Select power wire gauge and insulation type per NEC and local code requirements. Maximum allowable voltage fluctuation ±10% or nameplate rated value.
3. Properly ground each Outdoor Unit per NEC and local codes. On multi-frame installations, ground each frame separately.
4. Ground each Indoor Unit and Heat Recovery Unit (if applicable) separately to a solid earth ground source per NEC and local code requirements.

Figure 57: Schematic of Suggested Power Wiring.



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Connecting the Power Wiring

Best practice dictates using ring or spade terminals to terminate power wiring at the power terminal block. If ring terminals or spade clips are not available, then:

- Do not terminate different gauge wires to the power terminal block. (Slack in the wiring may generate heat.)
- When terminating wires of the same thickness, follow the instructions demonstrated in the figures below.
- Firmly attach the wire; secure in a way to prevent external forces from being imparted on the terminal block.
- Use an appropriately sized screwdriver for tightening the terminals.
- Do not overtighten the connections; overtightening may damage the terminals.

Figure 58: Close up of a Typical Ring Terminal.

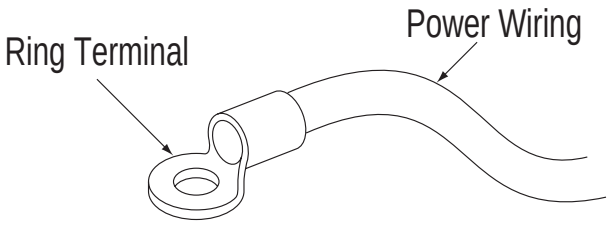
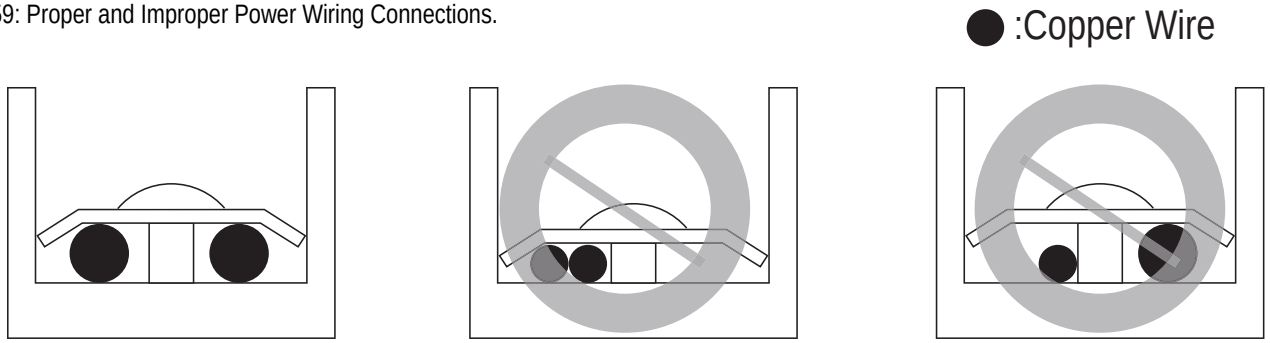


Figure 59: Proper and Improper Power Wiring Connections.



Terminate multiple power wires of the same gauge to both sides.

Do not terminate two wires on one side.

Do not terminate different gauge wires to a terminal block.

⚠ WARNING

If power wires are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.

⚠ Note:

- *Never apply line voltage power to the communications cable terminal block. If contact is made, the PCBs may be damaged.*
- *Always include some allowance in the wiring length when terminating. Provide some slack to facilitate removing the electrical panels while servicing.*

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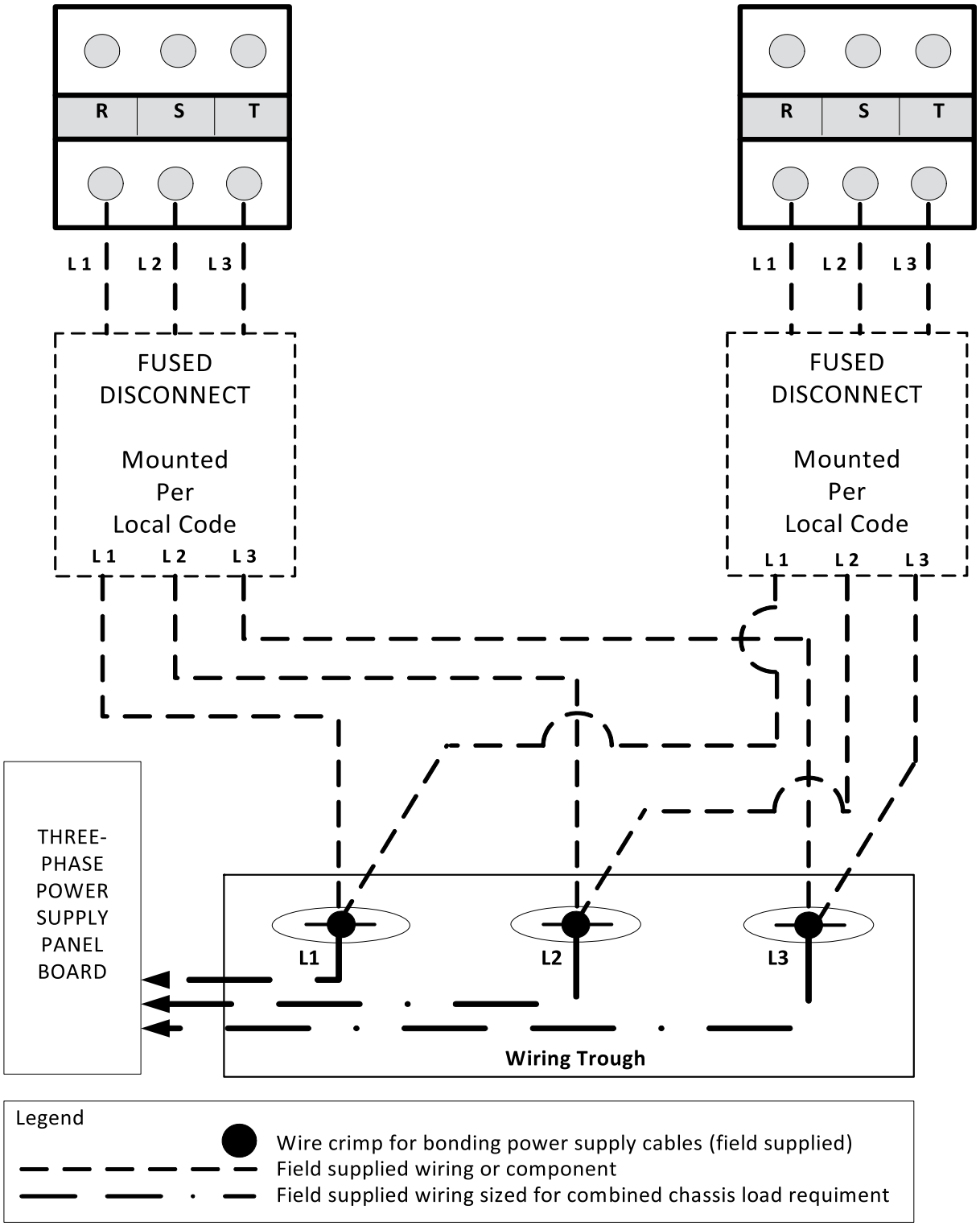
Dual Frame Outdoor Unit Wiring Configuration

⚠ Note:
All field power supply wiring must be engineered per local code.



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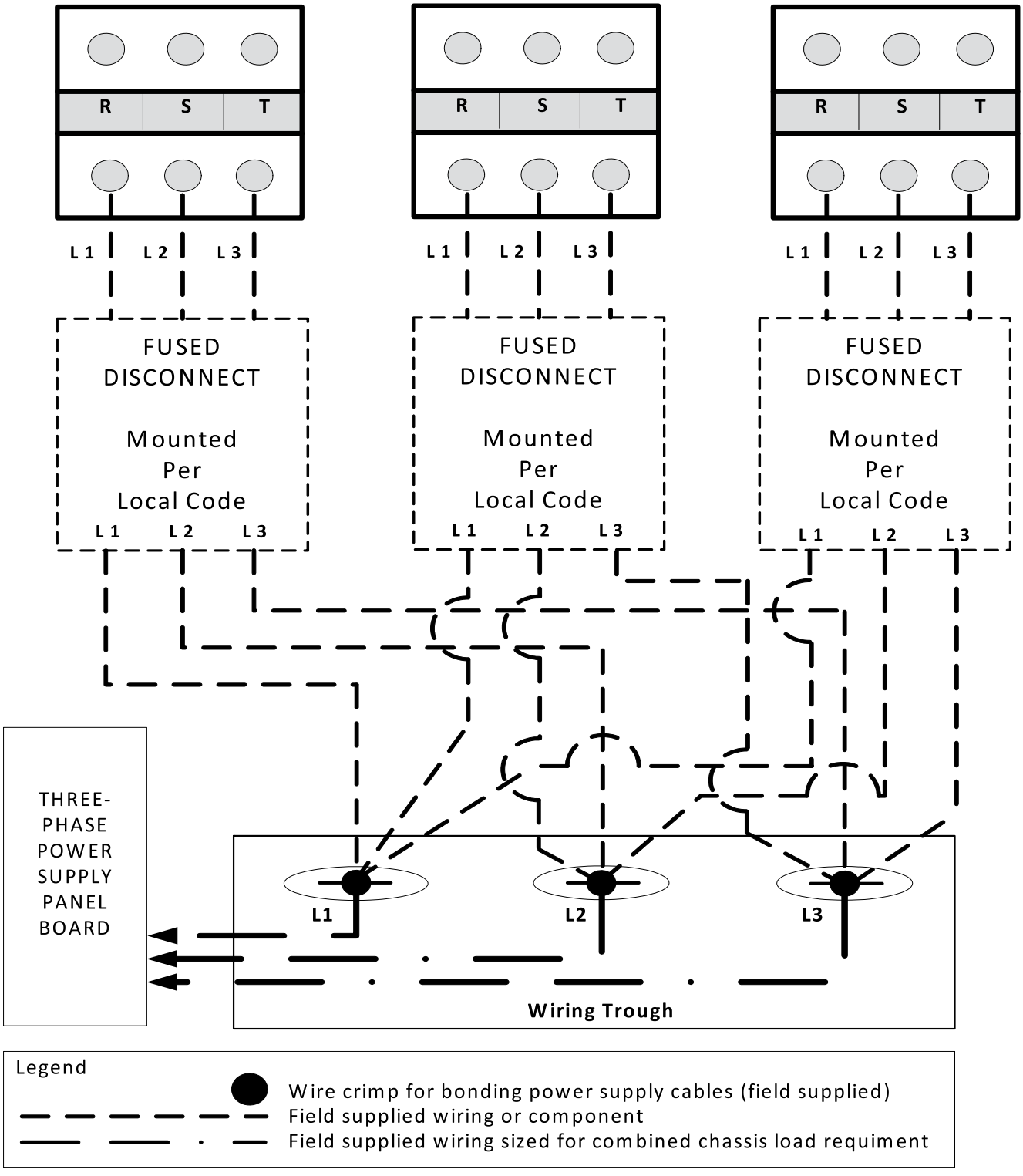
Triple Frame Outdoor Unit Wiring Configuration

⚠ Note:
All field power supply wiring must be engineered per local code.



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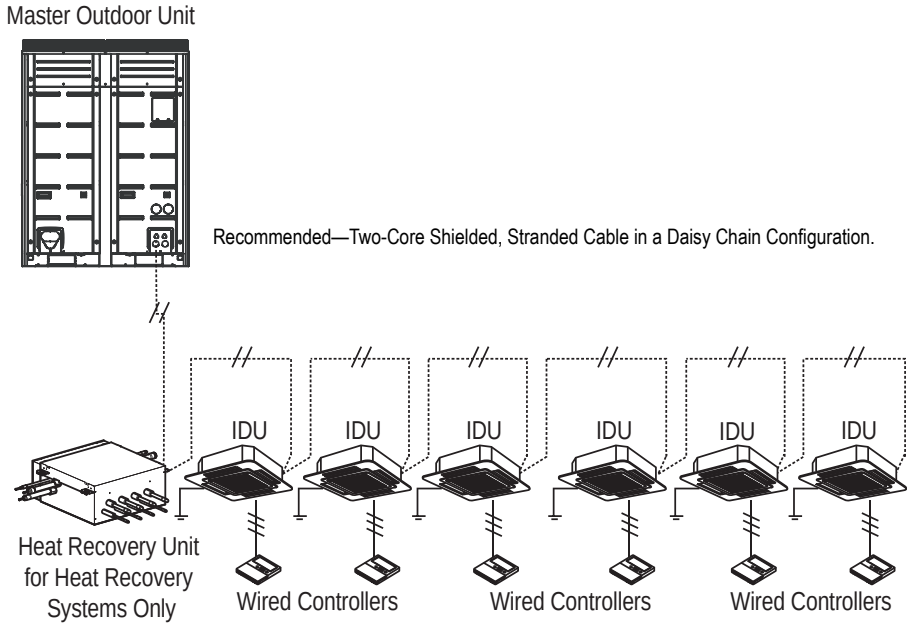
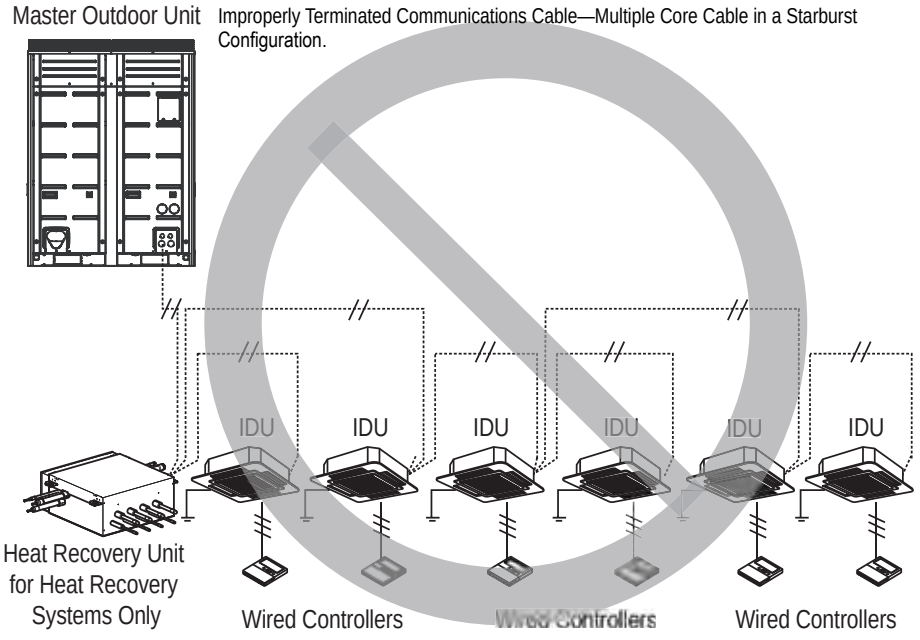
Communications Cable between the Master Outdoor Unit and Indoor Units / Heat Recovery Units (Heat Recovery Systems Only)

- Use a two-core, shielded, stranded cable between the outdoor unit(s) and the indoor units / heat recovery units (Heat Recovery Systems Only).
  - Minimum 18 gauge shielded CVVS or CPEVS cable.
  - Insulation material as required by local code
  - Rated for continuous exposure of temperatures up to 140°F.
  - Maximum allowable cable length: 984 feet.
- Use copper-bearing ring or spade terminals to terminate communication cables.
- Firmly attach the cable; provide slack but secure in a way to prevent external forces from being imparted on the terminal block.
- Communications cable connecting the outdoor unit an indoor unit(s) should be installed and terminated in a daisy chain (BUS) configuration starting at the outdoor unit.
- Terminate the cable shield to a grounded surface at the outdoor unit(s) only. Cable shields between connected devices shall be tied together and continuous from the outdoor unit(s) to the last device connected.

Figure 60: Outdoor Unit Communications Labeling Schematic.





⚠ Note:

- *Ring and spade terminals used to connect communications cables MUST be copper bearing. Do NOT use terminals that are galvanized or nickle plate over steel.*
- *Always verify the communication cable is connected to a communications terminal on the outdoor unit(s). Never apply line voltage power to the communication cable connection. If contact is made, the PCBs may be damaged.*
- *The shield of the communications cable connecting the outdoor unit(s) to the indoor units should be grounded only to the outdoor unit(s) frame(s). Tie the shield of each cable segment together using a wire nut at each indoor unit.*
- *Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building.*
- *Position the outdoor unit(s) communications cables away from the power wiring. Refer to minimum spacing requirements provided in Table 48.*
- *Never use a common multiple-core communications cable. Each communications bus shall be provided a separate cable (i.e., between outdoor unit(s) and indoor units, outdoor units and central controller(s). If communications cables of separate systems are wired using a common multiple-core cable, it will result in a poor communications signal and unacceptable system operation.*

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ELECTRICAL SYSTEM INSTALLATION

Communications Cables

Communication Cables Between the Master Outdoor Unit and Indoor Units / Heat Recovery Units, continued.

- Communications Cable from the Outdoor Units and Indoor Units / Heat Recovery Units (Heat Recovery System Only) Begins at the Master Outdoor Unit.
- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

⚠ Note:

The terminal tagged "GND" on the outdoor unit main PCB is not an earth ground terminal. It is a neutral (-) terminal provided to connect the outdoor unit to central control devices.

Figure 61: Connecting Communication Cables to Outdoor Unit Communication Terminals.

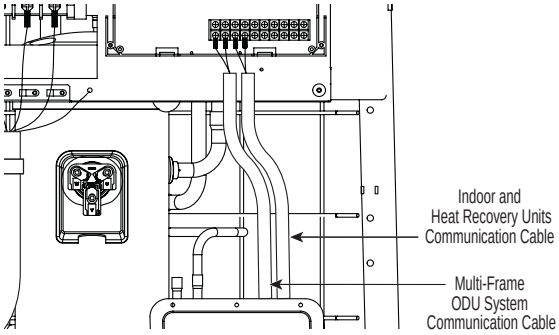
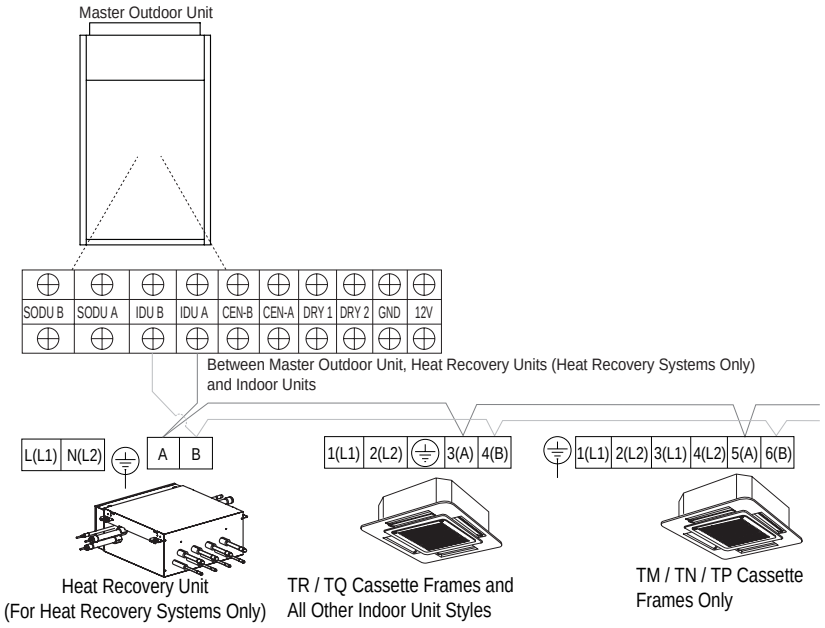


Figure 62: Outdoor Unit to Indoor Unit Communications Cable Termination Detail.



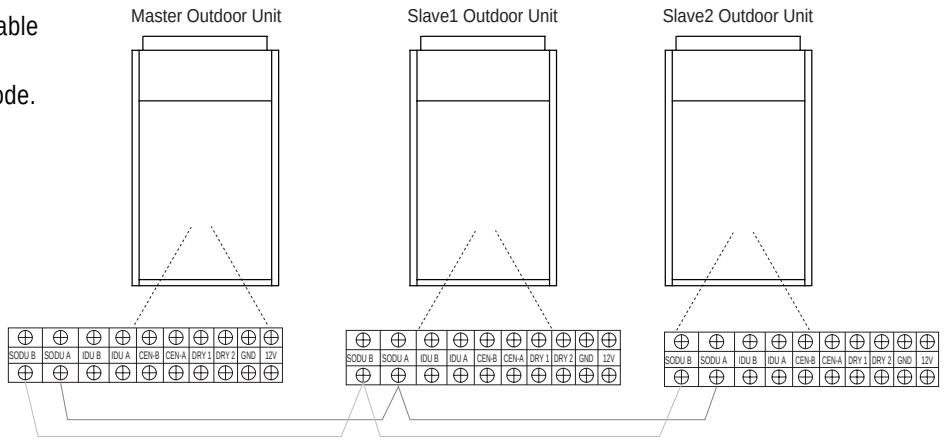
Communication Cables Between Master and Slave Outdoor Units Multi-Frame Systems Only)

- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

⚠ Note:

The terminal tagged "GND" on the outdoor unit main PCB is not an earth ground terminal. It is a neutral (-) terminal provided to connect the outdoor unit to central control devices.

Figure 63: Power Wiring Termination Detail.



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Communication Cables Between the Outdoor Unit(s) and the Central Control Device

- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

Connect all central control devices such as AC Smart II, AC Smart Premium, ACP, BACnet and LonWorks gateways, and energy recovery ventilators all on the same cable. Order does not matter. Polarity does. Keep “A” terminals with “A” terminals, and “B” terminals with “B” terminals. Starting at the outdoor unit, terminate the cable on terminals Internet A and Internet B. Route the cable as needed between each device.

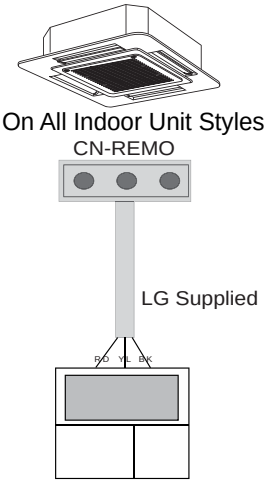
⚠ Note:
Connect the shield to ground ONLY at the outdoor unit. Tie shields together at each termination point.

Communication Cables Between the Indoor Units and the Wall-Mounted Zone Controller

- Only use LG provided three-core communications cable between the indoor unit and the wall-mounted zone controller.
- NEVER splice, cut, or extend cable length with field provided cable. If the length needs to be extended, the LG Extension Kit (sold separately) must be used. A maximum of four (4) kits (up to 165 feet) can be used.
- Set the indoor unit operating parameters using DIP switches or by setting up the zone controller. Refer to the indoor unit installation manuals for more details.

⚠ Note:
Cable connected to Zone Controller is the factory default connection.

Figure 64: Indoor Unit to Zone Controller Connection.

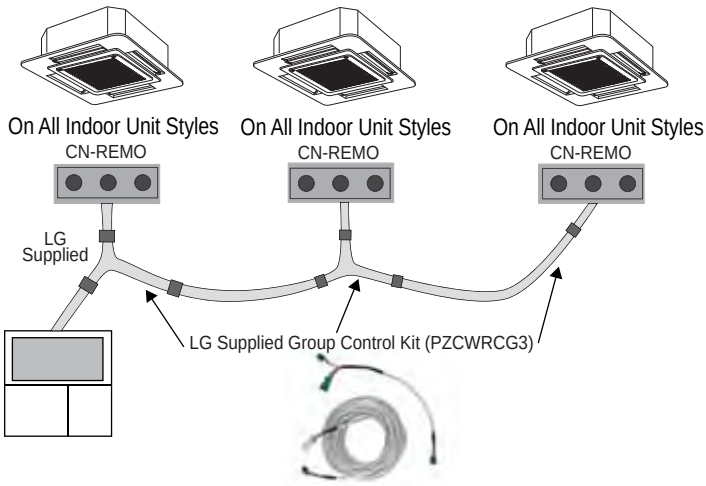


Communication Cables Between Multiple Indoor Units Operating as a Group (Group Control)

- If any indoor units were specified to operate in unison, use one (or multiple) three-core Group Control Kit (sold separately) containing extension and Y-splitter cables. One (1) group control cable kit for each indoor unit in the group except for the last indoor unit.
- Always use an LG provided group control communications cable (Group Control Kit; sold separately) between the indoor unit and the wall-mounted zone controller.
- NEVER splice, cut, or extend cable length with field provided cable.
- Before running cable, decide which indoor unit will be the “Master.” The zone controller will be connected to the “master.
- Identity each indoor unit operating as a group as “Master” or “Slave”. Adjust the pertinent DIP switch at each indoor unit. On wall mounted indoor unit models, set the assignment using the handheld remote controller.
- Use a daisy chain configuration and connect all of the group’s indoor units together starting at the “Master” unit.

⚠ Note:
Cable connected to Zone Controller is the factory default connection.

Figure 65: Indoor Unit Group to Zone Controller Connections.



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Prepare the Electrical System

1. Verify correct, clean, specified power is at the line side of each system component's disconnect.

2. Note if the green LED light on the component PCB board is illuminated.

3. If a Dynamic V-8 VL air cleaner is installed on a high static ducted model indoor unit, verify power has been provided to the air cleaner controller. Verify by observing the LED in the center of the disconnect plate is illuminated.

4. If a zone controller (Remote Unit controller on the Hydro Kit) is connected to the component, verify the LCD screen displays current operational characteristics.

Pre-commissioning Process

The pre-commissioning process will prepare the system for commissioning in several steps:

1. Power up the system.

2. Verify power is correct.

3. Run self diagnostics check.

4. Assign a system address to indoor units.

5. Assign addresses to heat recovery units (heat recovery systems only).

6. Assign each central control device an address.

Power Up the System / Verify the Power is Correct

Multi V IV outdoor units require either 208-230V / 60Hz / 3Ø or 460V / 60Hz / 3Ø power. Verify that the power and phase requirements are correct and all three legs are present. Make sure that the power imbalance ratio between phases is no greater than 2%. If the electrical power is dirty, the unit may shutdown on a compressor safety and/or the lifespan will be reduced.

Multi V IV outdoor units are inverter driven. Do not install a phase-leading capacitor. If one is included, it will deteriorate the power factor improvement effect, and may cause the capacitor to generate an abnormal amount of heat.

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Run Self Diagnostics Check

⚠ Note:

If the indoor units have already been successfully assigned a system address, skip this step and go to "Assign Addresses to the Heat Recovery Units."

1. Power all indoor units.

2. Power all heat recovery units in conjunction with powering indoor units (heat recovery systems only).

3. Verify the outdoor units to indoor units / heat recovery units communications cable is installed and terminated correctly.

4. Verify the communications cable between outdoor unit frames is installed and terminated correctly. Inspect terminals (SODU [B] and SODU [A]) at each outdoor unit.

5. Verify that DIP Switches 6 and / or 7 on the slave outdoor unit(s) were properly adjusted for the jobsite configuration.

6. Power all outdoor units. Order does not matter on multi-frame installation.

7. As the power is provided to the main printed circuit board (PCB) on the Master outdoor unit, observe the LED.
   - Wait. The perimeter segments will flash in sequence for 45 seconds.
   - Verify the microprocessor's outdoor unit configuration agrees with the submittal information approved the design engineer (see Tables 49 to 51).
   - Confirm that this step has been completed by checking the box provided on the Record following the information as it is provided. The date is provided in sequence, and segment of the sequence will remain lit for two (2) seconds.

Table 49: Display Code Definitions—Outdoor Unit Nominal Capacity.

Display Code (Nominal Horsepower)	8	10	12	14	18	20	22	24	26	28	32	34	36
Nominal Mb/h	6	8	10	12	14	16	18	20	22	24	26	28	30

Table 50: Display Code Definitions—Voltage.

Outdoor Unit Code	22	46
Electrical Requirements	208-230V / 60Hz / 3Ø	460V / 60Hz / 3Ø

Table 51: Segment Display Sequence (Two [2] seconds per segment following a forty-five [45] second wait).

Sequence	Description		Code(s)
1	Master Outdoor Unit Nominal Capacity (HP-Horsepower)		8 - 14 tons
2	Slave1 Outdoor Unit Nominal Capacity (If applicable; HP-Horsepower)		8 - 24 tons
3	Slave2 Outdoor Unit Nominal Capacity (If applicable; HP-Horsepower)		8 - ~ tons
4	Total Nominal Capacity of System (HP-Horsepower)		8 - ~ tons
5	Unit Type	Heat Pump	2
		Heat Recovery	3
6	Unit Voltage	208-230V / 60Hz / 3Ø	22
		460V / 60Hz / 3Ø	46
7	Not Applicable		1 or 2

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Indoor Unit Auto Addressing

⚠WARNING

Disconnects should only be operated by a properly licensed electrician at this time. Never look at a disconnect switch when closing. Turn away from the switch when closing. Incorrect wiring could cause the disconnect to explode, physical injury, and / or death.

⚠ Note:

During the pre-commissioning process, do not change any DIP switch settings. All switches should be left in the OFF position on both DIP switches SW01B and SW02B.

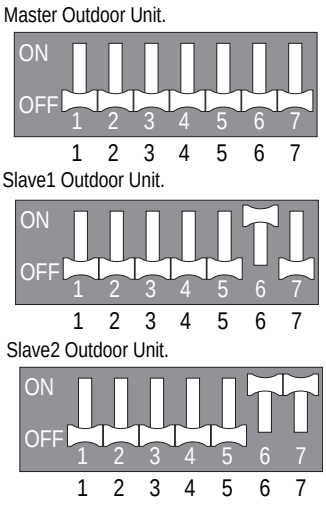
Initiate the Auto Addressing Procedure

⚠ Note:

- *If the Auto Address Procedure has never been successfully completed for the system, the compressor(s) will not start when power is applied to the unit.*
- *Auto addressing is only possible on the main PCB of the outdoor unit (master unit if dual / triple frame system).*

1. Verify all that all indoor units connected to the system have power to the PCB board AND all zone controller system start buttons are OFF.
2. Remove the maintenance access panel and unit control box cover from the outdoor unit. Place panels and screws in a secure area.
3. Verify that the communications cable between the indoor units and the outdoor unit is terminated at the outdoor unit terminals IDU(A) and IDU (B).
4. Verify the shield on the communications cable is grounded at the outdoor unit.
5. If installing a dual- or triple-frame system, verify which outdoor unit will be the “Master” unit, the Slave1 unit, and the Slave2 unit; check if the DIP switches on DIP-SW01 are set as shown on right. The outdoor unit with the largest capacity must be set as the Master unit.
6. Cycle power on the outdoor unit. Leave disconnect in the "ON" position.
7. Check the outdoor unit(s) current configuration code(s). Observe the unit setup codes using the LED display found on the outdoor units PCB. Each code will display for two (2) seconds.

Figure 66: Master, Slave1, and Slave2 DIP Switch Settings.



⚠ Note:

While this routine runs, the unit runs a self-diagnostics check. At completion, the LED should be clear and nothing displayed. Diagnostic process should take from three (3) to seven (7) minutes.

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Initiate the Auto Addressing Procedure, continued

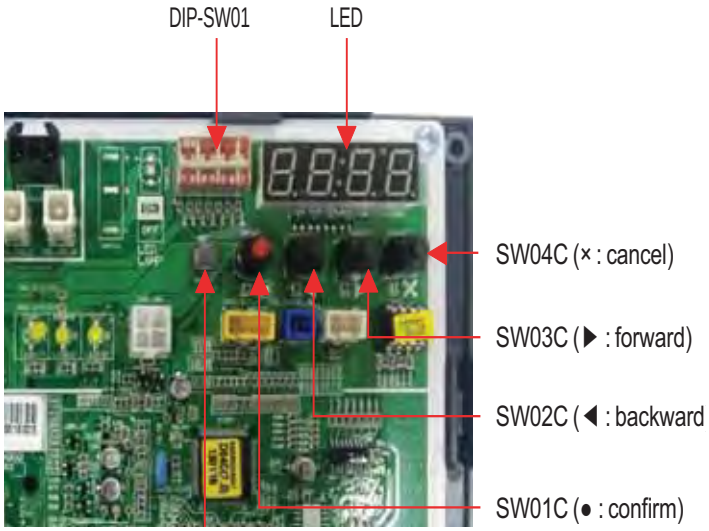
8. Know how many indoor units are connected to the system.

9. Press and hold the red SW01C button for about five (5) seconds. Release when “88” appears on the LED. After three (3) to seven (7) minutes, the display will flash a number for about ten (10) seconds indicating how many indoor units the system successfully communicated with.

10. This number should match the known installed number of indoor units if the auto addressing procedure was successful. Using LGMV, read the address of each indoor unit.

11. Upon completion of the auto addressing routine, the display will be blank and the system will be in standby waiting for another command.

Figure 67: Auto Address Button Location.



12. Upon successful completion of the auto address procedure, record the system address assigned to each indoor unit by the auto address procedure in the column provided on the Pre-commissioning Device Configuration Worksheet.

13. After recording the system addresses assigned to each device, open the outdoor unit disconnect. Remove the outdoor unit to indoor unit communications cable from terminals IDU(A) and IDU(B). Protect conductors by placing electrical tape over the bare ends.

14. Close the disconnect to reapply power to the outdoor unit and energize the compressor crankcase heater. Once again, verify that the outdoor unit to indoor unit(s) communications cable is not connected to terminals IDU(A) and IDU(B) of the outdoor unit.

15. Replace the control panel door.

⚠WARNING

Upon successful completion of the auto addressing function, an unintentional compressor start can occur unless the communications cable to the indoor units is removed from the outdoor unit terminals IDU(A) and IDU(B). Do NOT open the service valves or attempt to start outdoor unit compressors or until directed by the Commissioning Agent. Major damage to the unit piping and compressors will occur, and there is a risk of explosion, suffocation, physical injury, and / or death.

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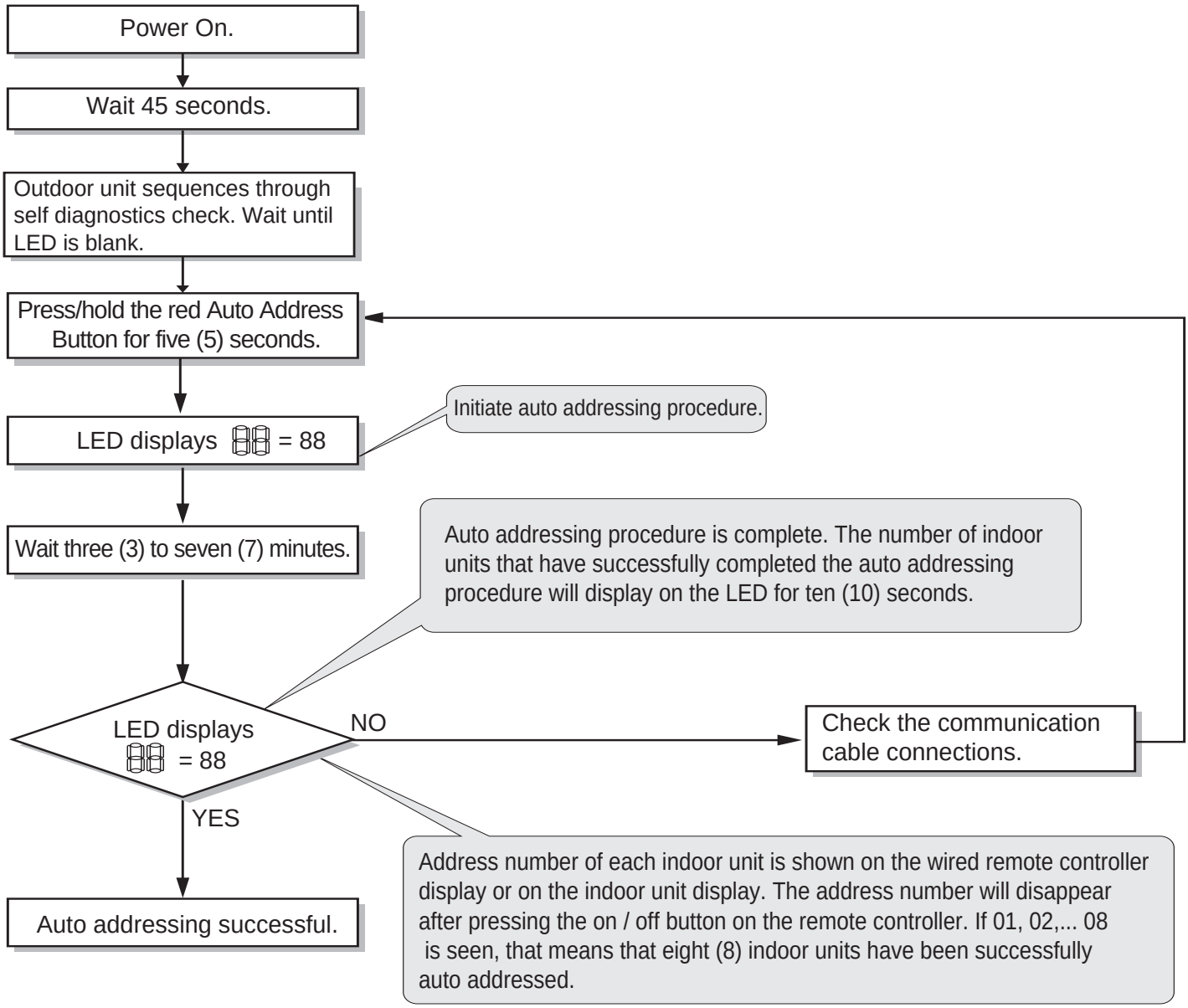
Figure 68: Indoor Unit Auto Addressing Procedure Flowchart.



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Troubleshooting a Failed Indoor Unit Auto Addressing Procedure

If the quantity of indoor units the auto addressing procedure found is incorrect, or the “88” never disappears from the display for the seven (7) minutes, the auto address routine has failed and a communications problem exists. If the Auto Address Procedure failed:

1. Verify ALL indoor unit ON/OFF buttons are in the OFF position (i.e., ON/OFF button NOT illuminated).

2. Check the terminations, polarity, and continuity of each conductor on the communications cable between the outdoor unit and the indoor units. Verify the indoor unit to outdoor unit communications cable is wired correctly.
   - Verify the conductor connected to the “3 (or “5” in the case of cassette frame codes TP, TN, TM) terminals on all indoor units and is terminated on the outdoor unit terminal tagged IDU(A).
   - In a similar fashion, verify the conductor connected to all indoor units on the “4” (or “6” in the case of cassette chassis codes TP, TN, TM) terminals and is terminated on the outdoor unit terminal tagged IDU(B).

3. Verify the shield of the communications cable is grounded at the outdoor unit only. All segment shields should be spliced together at each indoor unit and NOT grounded.

4. After repairing the communications cable, go to Step 9 of the Initiate the Auto Addressing Procedure and repeat the process until successful: Press and hold the red SW01C button for about five (5) seconds. Release when “88” appears on the LED. After three (3) to seven (7) minutes, the display will flash a number for about ten (10) seconds indicating how many indoor units the system successfully communicated with.

5. This number should match the known installed number of indoor units if the auto addressing procedure was successful.

6. Upon completion of the auto addressing routine, the display will be blank and the system will be in standby waiting for another command.

7. Record the system address the outdoor unit assigned to each indoor unit by the auto address procedure in the column provided on the Pre-commissioning Device Configuration Worksheet.

8. After recording the system addresses assigned to each device, open the outdoor unit disconnect. Remove the outdoor unit to indoor unit communications cable from terminals IDU(A) and IDU(B). Protect conductors by placing electrical tape over the bare ends to prevent an accidental compressor start from occurring before the Commissioning Agent arrives.

9. Close the disconnect to reapply power to the outdoor unit and energize the compressor crankcase heater. Once again, verify the outdoor unit to indoor unit(s) communications cable is not connected to terminals IDU(A) and IDU(B) of the outdoor unit.

10. Replace the control panel cover.

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Terminating Group Controlled Indoor Units

If any of the indoor units were specified to operate in unison, create a group control communications circuit between the indoor units using a group control cable kit consisting of three (3) cables:

- One pigtail cable.
- One Y-cable.
- One extension cable segment.

1. Before proceeding with group control cable terminations, verify power is off at all indoor units effected.
2. Identify which indoor unit will be the “Master” unit of the group. If not already recorded, record the "Master" and the "Slave" identity assignment to each indoor unit in the group on the Pre-commissioning Device Configuration Worksheet.
3. Termination Procedure:
   - Starting with the Master unit, plug in the male end of the pigtail cable into the CN-REMO socket. At the last Slave indoor unit in the group, a pigtail cable is not required. Plug the male end of the extension cable coming from the previous indoor unit into the CN-REMO socket.
   - Plug the Y-cable into the pigtail at each indoor unit except for the last Slave indoor unit in the group where no Y-cable cable will be needed.
   - Connect two extension cable segments to each “Y” cable except for the “Y” cable connected to the Master indoor unit. At the Master indoor unit, connect one extension cable and the communications cable from the zone controller to the Y-cable.

Plan the Central Control Addresses Assignments

Check with the building’s Chief Engineer and gather any preferences he may have. If there are no preferences:

- Hex assignments do not have to be assigned in any particular order, or an order defined by the routing of the communications cable between the indoor units. In most cases, Hex addresses can be skipped.[1]
- All members of a Hex Group are not required to be on the same Multi V system.
- Addresses can be assigned at random, not in any particular order, and can be skipped.[1]

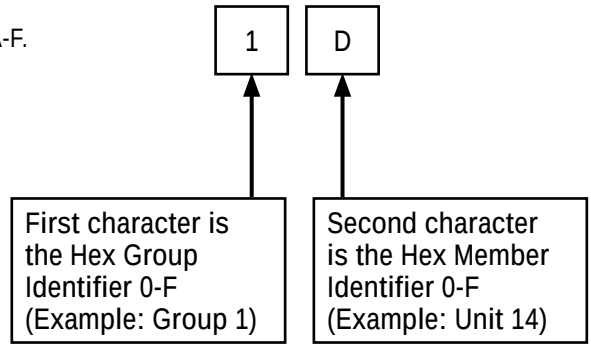
[1]On AC EZ, do not skip addresses. Start with Hex address 0. Buttons have pre-assigned Hex addresses. If an address is skipped, the associated button will do nothing.

Indoor Unit Central Control Address Assignments

A central control address is made up of two hexadecimal characters.

- The first character in the central control address is the Hex Group Identifier. Possible Hex Group Identifiers (in order of lowest to highest) are 0-9 followed by A-F.
- The second character in the address is the Hex Member Identifier in a Hex Group. Hex Member Identifiers (in order from lowest to highest) are 0-9 followed by A-F.

Figure 69: Central Control Address Nomenclature.



Hex Address Assignment Limitations

- There is a limit of 16 Members per Hex Group
- There is a limit of 16 Hex Groups per VRF system.
- There is a limit of 256 possible Member Identifiers per Central Control (See Central Controller Communications Limitations on the next page).

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Central Controller Communications Limitations

Each type of Central Controller device is designed to communicate with a limited quantity of indoor units. The quantity of indoor units that can be connected to a single central control communications cable, therefore, will be defined by the central control device on that cable with the smallest Maximum Indoor Unit Quantity as shown at right.

Table 52: Central Controller Indoor Unit Connection Limitations.

Central Control Device	Maximum Indoor Unit Quantity
AC EZ	32
AC Smart II	64
AC Smart II with Expansion Kit	128
AC SMART Premium	128
LonWorks Gateway	64
BACnet Gateway	256
Advanced Control Platform	256

Group Number

If the building operator wants to know which indoor units are on each outdoor unit, and multiple systems serve a building:

- Assign a Group Number to each system. If there are more than 16 indoor units on a system, multiple Group Numbers may be necessary.

If the building owner wants to know which indoor units are on each floor:

- Assign a different group number for each floor. If there are more than 16 indoor units on a floor, multiple Group Numbers may be necessary.

Member Number

Can be assigned at will or for example, can follow the room layout on each floor.

For each LG Central Controller product provided on the project, devise a central control address schedule and assign a central control address to each indoor unit(s) Hydro Kit(s), and ERV(s) units. Record this central control address for each component in the column provided on the Pre-commissioning Device Configuration Worksheet.

Upload Central Control Address to the Indoor Units

For all ducted, vertical and floor standing indoor units, the central control address must be assigned using a wired zone controller. Wall-mount, ceiling cassette, ceiling suspended, and the wall/ceiling convertible indoor units, the central control address can be assigned using a wireless handheld controller or a wired zone controller.

Power Up All Indoor Unit PCBs

Turn the disconnect for each indoor unit to the “ON” position. DO NOT turn the unit ON (on/off button remains off).

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⚠ Note:
During the following procedure, NEVER PUSH the ON/OFF (Enable operation) Button on the zone controller.

For Indoor Units That ARE NOT Being Controlled as a Group

1. Verify the zone controller cable is plugged into CN_REMO socket on the indoor unit PCB.
2. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.)
3. Type in the Hex Central Control address that has been designated to the unit.
4. Repeat Steps 1 through 3 for each indoor unit in the building.

For Indoor Units That ARE Being Controlled as a Group

1. Before attempting to assign a central control address to an indoor unit controlled as a group, identify which unit in the group will be identified as the Master indoor unit and which indoor units are going to be identified as Slave units.
2. Go to the Master indoor unit and access the PCB.
3. Verify a group control pigtail cable is plugged into the CN-REMO socket on the indoor unit PCB. If it is not, do so now by plugging the communications cable pigtail into the CN-REMO socket.
4. If the group control extension cable between the indoor units is plugged into the Y-cable, unplug the extension cable from the Y-cable.
5. If not already present, plug the zone controller communications cable into the pigtail cable.
6. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.) Type in the Central Control address designated for the Master indoor unit.
7. Disable power to the Master indoor unit. Do not restore Power to the Master indoor unit at this time. It shall be restored in step 18.
8. If the zone controller and associated communications cable has already been permanently mounted in place, plug the Y-cable back into the pigtail and obtain a loose zone controller with a communications cable to continue programming the Slave indoor units.
9. Go to the first Slave indoor unit and disconnect the Y-cable from the pigtail.
10. Plug the zone controller communications cable into the socket on the pigtail cable. Do not push the ON / OFF button or enable indoor unit operation.
11. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.) Type in the Hex address assigned to the unit.
12. Change DIP Switch No. 3 on the indoor unit PCB to the "ON" position.
13. Disable power to the indoor unit using the disconnect switch. Wait one (1) minute.
14. While power is off, unplug the zone controller cable from the pigtail socket.
15. Plug the group control Y-cable back into the pigtail.
16. Restore power to that Slave indoor unit, and go to the next Slave indoor unit.
17. Repeat Steps 9 to 16 for each Slave indoor unit except the last one in the group. At the last Slave indoor unit, the process is the same except unplug the group control cable from socket CN-REMO on the indoor unit PCB board and plug the zone controller cable into the same socket.
18. After all Slave indoor unit have addresses assigned, go back to the Master indoor unit and restore power.

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Indoor Unit Temperature Sensing Location Selection

For each indoor unit connected to a wired zone controller, select a zone temperature sensing option. Assign one of three methods for the indoor unit to sense the zone temperature. Skip this step for indoor units controlled from a handheld (wireless) controller. Record the sensing for each indoor unit on the Pre-commissioning Device Configuration Worksheet. There are three possible strategies:

1. Use the unit-mounted return air sensor (or the optional remote wall-mounted sensor).

2. Use the sensor mounted in the zone controller.

3. Sense the temperature at the unit-mounted return air sensor (or the optional remote wall-mounted sensor) and sensor mounted in the zone controller, then control based on the temperature reading using the sensor that is farthest from set-point.

Conduct an Air Balance for Ducted Indoor Units

For each ducted model indoor unit, confirm that the Test and Balance contractor adjusted the fan speed setting values. Record the actual fan setting value used to deliver cataloged CFMs at the jobsite static pressure conditions in the appropriate column on the Pre-Commissioning Device Configuration Worksheet. If the fan setting value was left at the factory default insert “00” in the blank.

⚠ Note:

It is always best if the air balance is completed prior to a request for a commissioning agent. If the air balancing contractor has not completed the work before commissioning, the Commissioning Agent is not responsible for setting the indoor unit air flow rates, fan speed, or insure the air volume delivered at each indoor unit is per project specifications, only to spot check. Excessive or restricted airflow may impact the ability of the Commissioning Agent to successfully complete system commissioning. If problem exists, request verification from the Test and Balance contractor. If necessary, provide instruction to the air balance technician on how to adjust the indoor unit fan setting value.

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LG

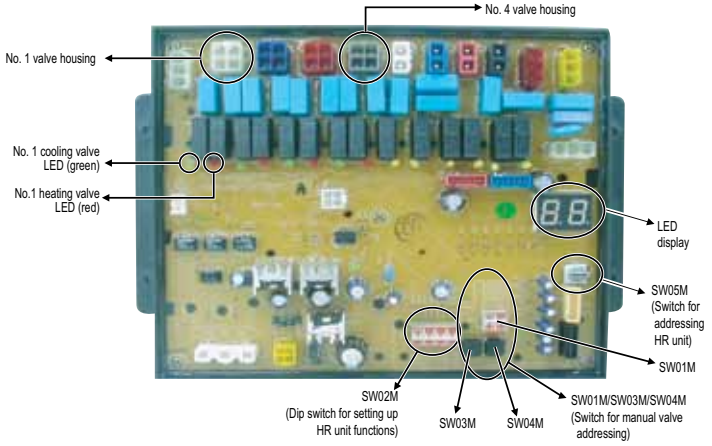
Setting up the Heat Recovery Unit (Only For Heat Recovery Systems)

General

Each heat recovery unit will have a unique address assign so the outdoor unit will be able distinguish it from other heat recovery units. The unique address is assigned by adjusting the rotary dials on the heat recovery unit printed circuit board (PCB).

Upon completion of the heat recovery unit address, the heat recovery unit operating parameters will be set by adjusting the positions DIP Switches on SW01M, SW02M.

Figure 70: Heat Recovery Unit PCB Dip Switches.



Procedure

Before beginning the physical process of assigning heat recovery addresses, map out the address assignments using a copy of the LATS tree mode diagram.

Guidelines

1. Addresses must be sequential and addresses cannot be skipped.
2. Assign the lowest address to the heat recovery unit that has the largest capacity indoor unit connected to port number 1. If the capacity of all indoor units connected to port number 1 of each heat recovery unit is the same, assign address “0” to the heat recovery unit farthest away from the outdoor unit. Assign the next address to the next farthest away and so on until all heat recovery units have an address. The heat recovery unit with the highest address should be the one closest to the outdoor unit. Up to 16 boxes can be on a single system. Possible settings in order of lowest to highest are: 1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

⚠ Note:

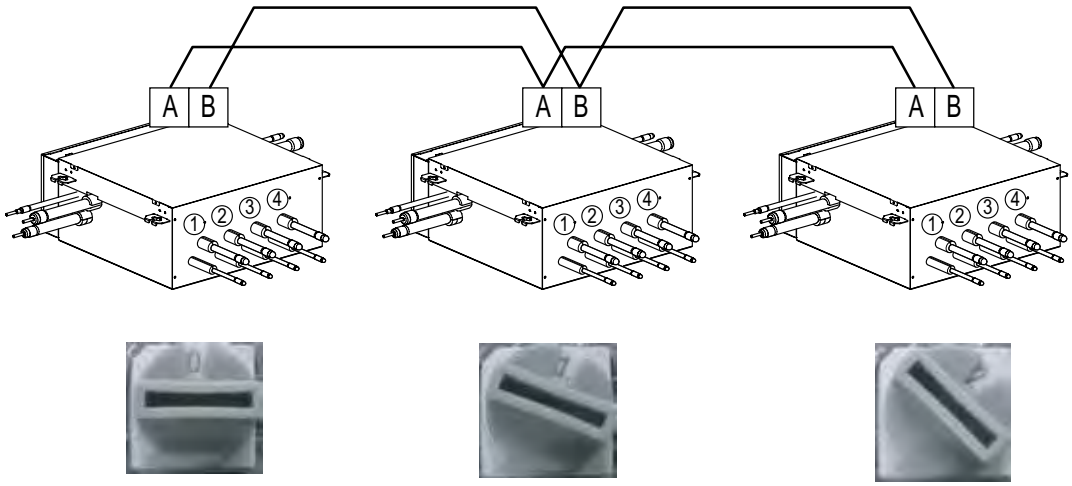
Addressing must be performed following the detailed steps above because port number 1 on the heat recovery unit addressed “0” will remain open during the auto pipe detect procedure. If the indoor unit capacity connected to the port is relatively small compared with other units on the system, the outdoor unit high head pressure safety will trip and shut down the unit during the procedure.

3. Record the address assigned to each heat recovery unit in the pertinent column on the Pre-Commissioning Device Configuration Worksheet.

SW05M Function (Rotary Switch for Addressing Heat Recovery Units)

- SW05M must be set to "0"' when installing only one heat recovery unit.
- When installing multiple heat recovery units, address each unit with sequentially increasing numbers starting from "0".

Figure 71: Adjusting the Heat Recovery Unit Addresses.



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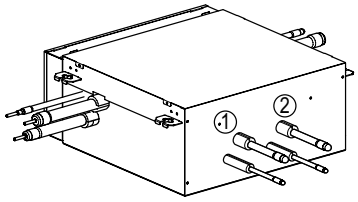
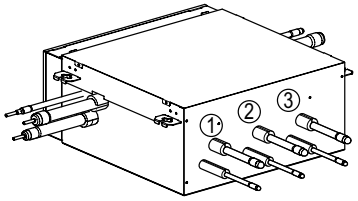
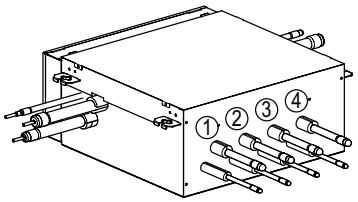
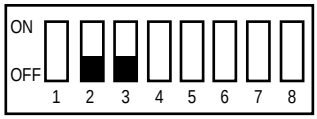
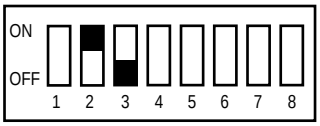
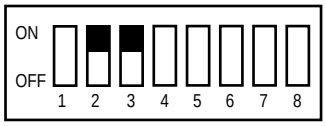
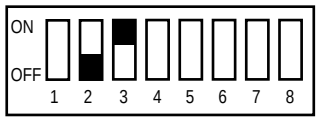
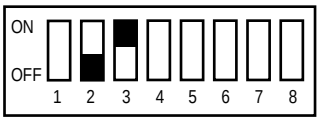
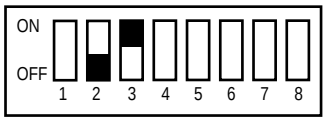
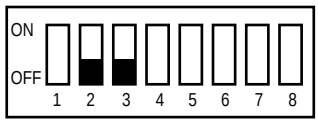
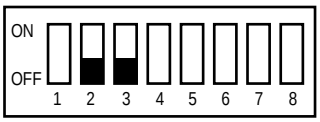
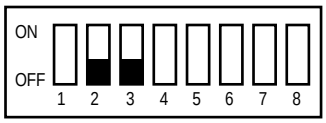
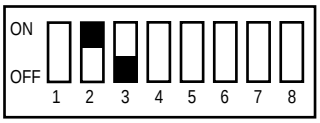
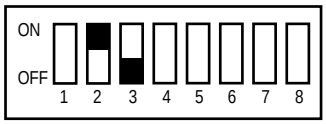
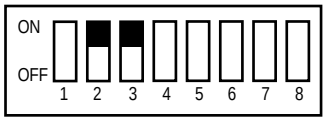
PRE-COMMISSIONING

Setting Up the Heat Recovery Unit (Only For Heat Recovery Systems)

Configure the Heat Recovery Unit Settings

1. Identify how many ports are connected (see Table 53).
2. Group ports if necessary. If any connected indoor units are “large” capacity models (indoor units with >54,000 Btu/h capacity) two heat recovery ports must be “grouped” to serve a large capacity indoor using an inverted ‘Y” branches.
3. Set DIP Switches as outlined in Tables 53 and 54.

Table 53: Selecting the Heat Recovery Unit Model.

	 PRHR021A (Two [2] ports)	 PRHR031A (Three [3] ports)	 PRHR041A (Four [4] ports)
Factory Setting			
One port connected			
Two ports connected			
Three ports connected			
Four ports connected			

⚠ Note:

Each heat recovery unit has dip switches No. 2 and No. 3 factory set as shown above in initial setting.

- *To use a PRHR021A for one port, cap off the second pipe, and set the dip switches on the heat recovery unit for "one port connected" as shown in the table above.*
- *To use a PRHR031A for two ports, cap off the third port, and set the dip switches on the heat recovery unit for "two ports connected" as shown in the table above.*
- *To use a PRHR041A for three ports, cap off the fourth port, and set the dip switches on the heat recovery unit for "three ports connected" as shown in the table above.*
- *To use a PRHR041A for two ports, cap off the third and fourth ports, and set the dip switches on the heat recovery unit for "two ports connected" as shown in the table above.*
- *Any unused port must be sealed with a brazed copper cap, not with a plastic cap.*

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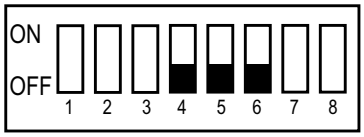
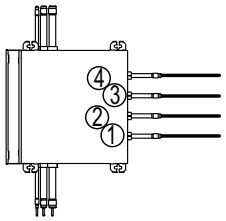
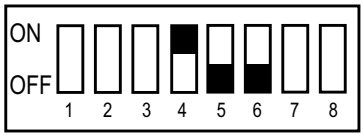
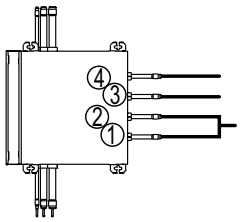
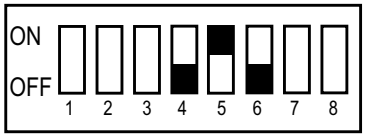
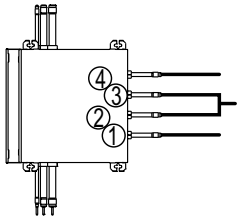
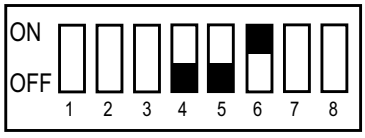
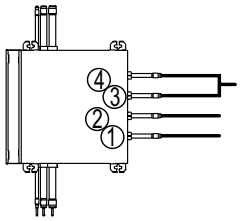
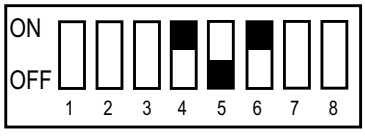
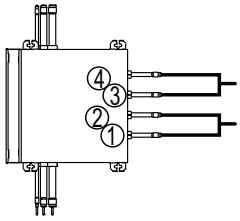
Table 54: Valve Group Settings.

	Dip Switch Setting	Example
No Valve Group Control		 Indoor unit Indoor unit Indoor unit Indoor unit
No. 1, 2 Valve Control		 Indoor unit Indoor unit Large capacity indoor unit
No. 2, 3 Valve Control		 Indoor unit Large capacity indoor unit Indoor unit
No. 3, 4 Valve Control		 Large capacity indoor unit Indoor unit Indoor unit
No. 1, 2 Valve Control No. 3, 4 Valve Control		 Large capacity indoor unit Large capacity indoor unit

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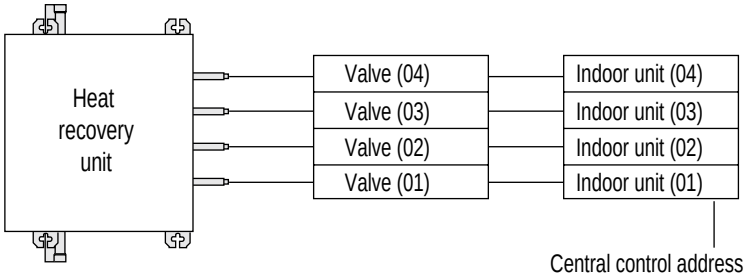
Setting up the Heat Recovery Unit (Only For Heat Recovery Systems)

⚠ Note:
If manual addressing, the heat recovery unit valve address and the central control address of its corresponding indoor unit should be set using the same number.



SW01M / SW03M / SW04M DIP Switch and Tact Switch for Manual Heat Recovery Unit Valve Addressing

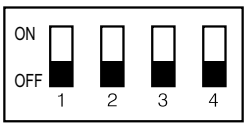
Use to manually address the heat recovery unit valve.

Normal Setting

1. Set the address of the heat recovery control unit valve to the central control address of the connected indoor unit.
   - SW01M: Selects the valve to address.
   - SW03M: Increases the ten (10) digit of the valve address.
   - SW04M: Increases the valve address by one (1).

2. Prerequisite for manual valve addressing: The central control address of each indoor unit must be preset at its wired remote controller.

Table 55: Manual Valve Addressing.

	Dip Switch No.	Setup
 SW01M	No. 1	Manual addressing valve No. 1
	No. 2	Manual addressing valve No. 2
	No. 3	Manual addressing valve No. 3
	No. 4	Manual addressing valve No. 4
SW03M	SW03M	Increases the ten (10) digit of the valve address
SW04M	SW04M	Increases the valve address by one (1)

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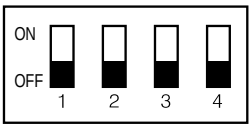
Zone Setting

1. Set the address of the heat recovery control unit valve to the central control address of the connected indoor unit.
   - SW01M: Selects the valve to address.
   - SW03M: Increases the ten (10) digit of the valve address.
   - SW04M: Increases the valve address by one (1).
   - SW05M: Rotary switch.

2. Prerequisite for manual valve addressing: The central control address of each indoor unit must be preset at its wired remote controller.

Table 56: Zone Setting.

	Dip Switch No.	Setup
 SW01M	No. 1	Manual addressing valve No. 1
	No. 2	Manual addressing valve No. 2
	No. 3	Manual addressing valve No. 3
	No. 4	Manual addressing valve No. 4
SW03M	SW03M	Increases the ten (10) digit of the valve address
SW04M	SW04M	Increases the valve address by one (1)
SW05M	SW05M	Manual addressing zoned indoor units

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PRE-COMMISSIONING

Prepare the Refrigerant Piping System

Verify a Pressure (Leak) Test Has Been Performed

If not, perform one now. Use medical grade dry nitrogen and pressure test the refrigerant piping system to a minimum of 550 psi for a period of 24 hours.

Evacuate the Refrigerant Piping System

⚠ Note:

- *The outdoor unit may be put in "vacuum mode". Generally, using the vacuum mode feature does assist with the vacuum process and is not necessary if a vacuum pump is connected to all charging ports at the outdoor unit(s) simultaneously as suggested herein. See the Technical Service Manual for this product for more information.*
- *For refrigerant charging in a multi-frame system, only use the charging ports on one outdoor unit (does not matter which one).*
- *For evacuation purposes in a multi-frame system, connect to the hot gas service port and liquid service port on only one outdoor unit.*

⚠ Note:

DO NOT apply power to any Multi V system device prior to performing a system evacuation. There is a possibility that EEV valves may close and isolate sections of the pipe system, Contact your LG Applied Rep champion or service technician for the procedure to reopen the EEV valves before evacuation.

1. Release the Pressure Test dry nitrogen charge from all refrigerant pipes.
2. Verify ALL field installed isolation ball valves are OPEN (including those that are capped for future use).
3. Remove and discard the Schrader valve cores at the outdoor unit(s) charging ports. (This is a preventive step that ensures that valves used after charging the system have not been subjected to the high pressure value used during the Pressure Test.)
4. Attach a 5/16" core removal tool equipped with ball valve and a new core to each charging port on the outdoor unit.
5. Check the vacuum pump(s) you intend to use and verify the oil in the sump is fresh and not contaminated.
6. Attach the vacuum pump(s) to each charging port simultaneously using high quality refrigerant vacuum hoses.
7. Perform a triple evacuation.
8. Achieve a micron gauge reading of less than 500 microns.
9. At 500 microns, valve off the charging port by closing the core removal tool ball valves.
10. Remove the vacuum hoses and pumps.

⚠ Note:

Do not open the outdoor unit service valves and release the factory refrigerant charge until the Commissioning Agent authorizes to do so.

11. Leave the refrigerant piping system in a vacuum until the Commissioning Agent arrives and is satisfied with the micron gauge reading.

⚠ Note:

The system must be left in a vacuum until the Commissioning Agent arrives and verifies the quality of the evacuation process. If the evacuation procedure was not conducted properly, the system will likely malfunction and operate erratically. Significant costs may be incurred including but not limited to refrigerant reclaim, recycle, and replacement.

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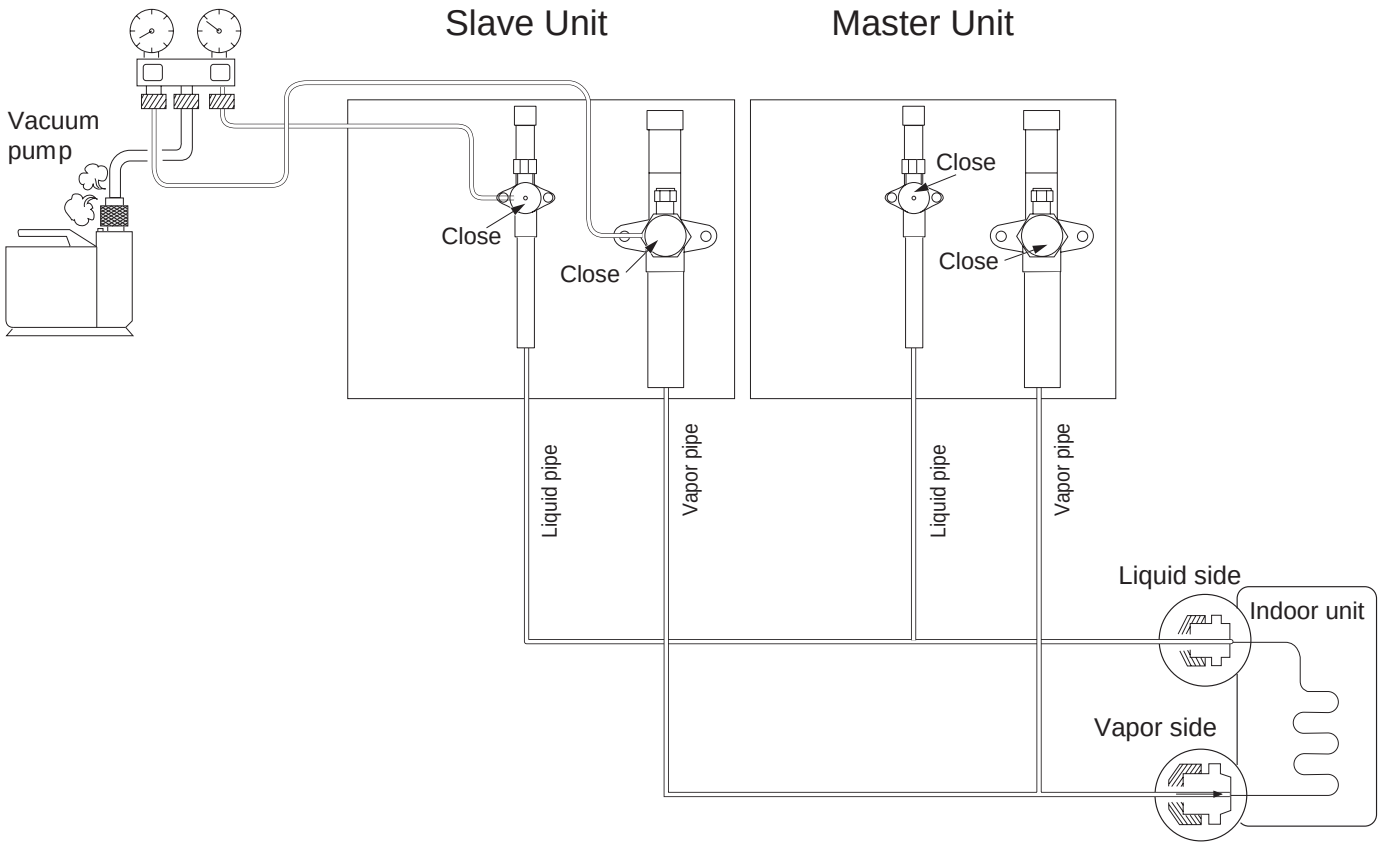
Vacuum for Heat Pump Systems

Vacuum the refrigerant piping system by connecting the vacuum pump to the service ports for the liquid pipes and the vapor pipes on the outdoor unit. Use a vacuum pump with a gauge that can evacuate to 500 microns, and vacuum with the service port valve closed. Never air purge with refrigerant.

1. Evacuate the system for two (2) hours, bringing the system up to 500 microns. After maintaining the system to 500 microns for more than one (1) hour, confirm that pressure has risen. If not, there may be moisture or a leak somewhere in the refrigerant piping system.
2. If the system has been evacuated for more than two (2) hours and it is suspected that moisture may be present (rainwater may have entered the piping if installation look a long time to complete, or if work occurred during a rainy season), pressurize to 14 psi (vacuum break) with nitrogen gas, and then vacuum again for one (1) hour to 500 microns. If the system cannot be evacuated to 500 microns within two (2) hours, repeat vacuum break. After maintaining the system in vacuum for one (1) hour, check to the vacuum gauge to see if pressure has risen.



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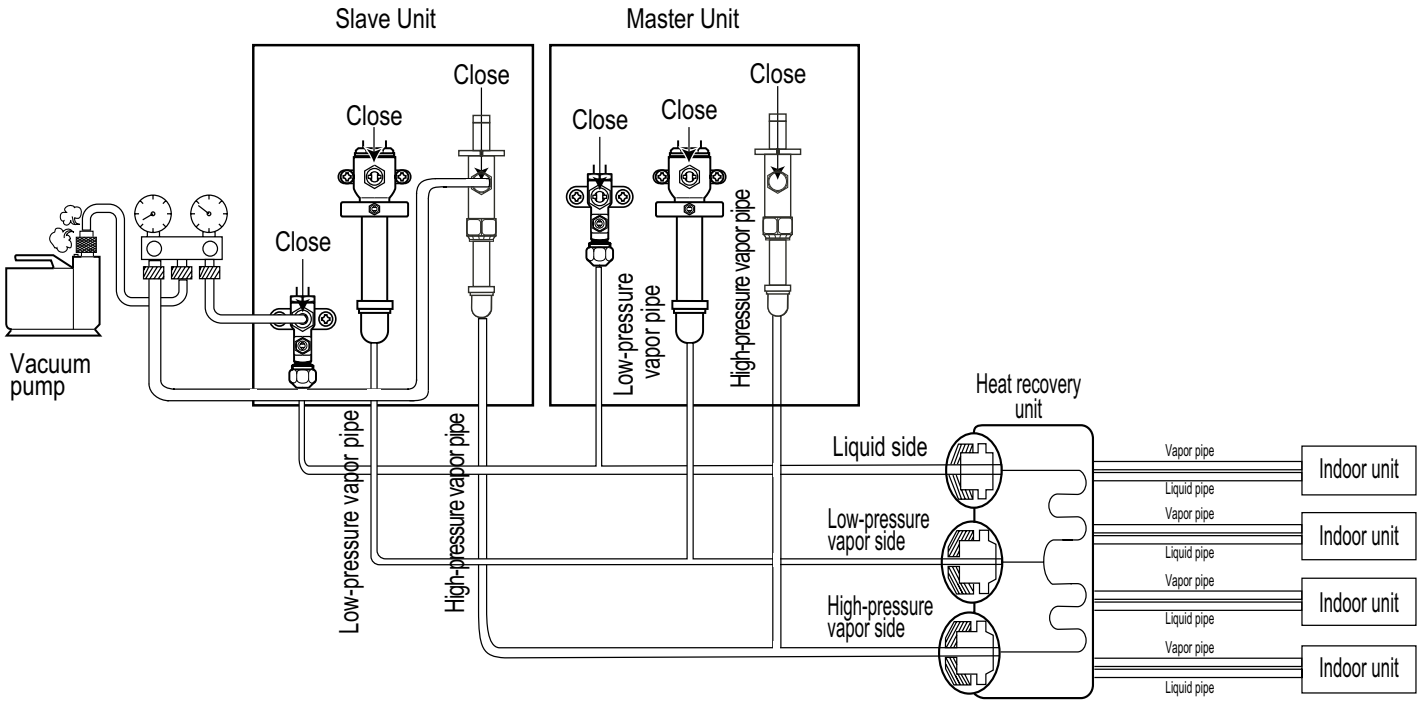
Vacuum for Heat Recovery Systems

Vacuum the refrigerant piping system by connecting the vacuum pump to the service ports for the liquid pipes and the high-pressure vapor pipes on the outdoor unit (the low-pressure vapor pipe is included in the vacuum procedure through the heat recovery unit). Use a vacuum pump with a gauge that can evacuate to 500 microns, and vacuum with the service port valve closed. Never air purge with refrigerant.

1. Evacuate the system for two (2) hours, bringing the system up to 500 microns. After maintaining the system to 500 microns for more than one (1) hour, confirm that pressure has risen. If not, there may be moisture or a leak somewhere in the refrigerant piping system.
2. If the system has been evacuated for more than two (2) hours and it is suspected that moisture may be present (rainwater may have entered the piping if installation look a long time to complete, or if work occurred during a rainy season), pressurize to 14 psi (vacuum break) with nitrogen gas, and then vacuum again for one (1) hour to 500 microns. If the system cannot be evacuated to 500 microns within two (2) hours, repeat vacuum break. After maintaining the system in vacuum for one (1) hour, check to the vacuum gauge to see if pressure has risen.



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Prepare Pre-commissioning Package Documents

1. A copy of the refrigerant piping system(s) shop drawing(s) generated by LATS Multi V pipe design software.
2. A copy of the pipe fitter's pipe changes and field notes.
3. A verified copy of the "As-Built" LATS Multi V Project file (*.mtv) that includes all changes noted by the pipe fitter(s) in 2. Notes should include changes to the line lengths and # elbows used for each liquid line segment
4. A copy of a completed and verified Installation Checklist for the outdoor unit(s), indoor units, heat recovery units, ERVs, Air Cleaners, and Control Devices. Correct any needing attention before continuing.
5. A completed Pre-commissioning Device Configuration Worksheet.
6. A completed copy of the Pre-commissioning Checklist.
7. If an AC Smart Central Controller is provided and it is to be connected to the building network, record the IP Address on the Pre-commissioning Device Configuration Worksheet.

Optional, but Highly Recommended

It is always best if the air balance is completed prior to a request for a commissioning agent to insure the air volume delivered at each indoor unit is per project specifications. The commissioning agent is not responsible for setting the indoor unit fan speed or ensure the air volume delivered at each indoor unit is per project specifications. Excessive or restricted airflow may impact the ability of the commissioning agent to successfully complete system commissioning. Upon completion of the air balance, the report should include the adjusted indoor unit's fan speed (i.e., fan setting value) set by the Test and Balance technician to deliver cataloged air volume (CFM) at jobsite static pressure conditions.

Initiate a Request for a System Commissioning

Contact your LG Applied Representative's Project Manager or your account representative and request a System Commissioning. Provide all the documents listed in "Prepare Pre-commssioning Package" section above.

System Commissioning

The Multi V System commissioning process and procedures are provided in a separate manual and/or in training materials provided by the LG Academy Training Team. To obtain a copy, you must be a certified LG commissioning agent.

After Commissioning Has Been Requested

The commissioning agent may contact you to discuss specific job points, scheduled day(s) and expected duration. It is the contractor's responsibility to provide all of the necessary start-up labor, refrigerant, tools and test equipment needed to complete the process in the expected time frame. Please note that the commissioning agent's allotted time at your project DOES NOT include owner training.

It is understood that the contractor is to request for a commissioning agent when all required project readiness points are complete; not based on an "expected" completion date. The contractor also acknowledges that they will assume all responsibility for costs incurred by the commissioning agent including but not limited airfare, travel costs, transportation, shipping, labor, and tool costs due to lack of readiness.

The commissioning agent's schedule is usually very rigid, and may have no flexibility regarding duration. It also involves advance travel arrangements that may be impractical or impossible to change.

Freight Damage and Unit Replacements ..... Your LG Manufacturer Representative
Missing Parts ..... Your LG Manufacturer Representative
Received Wrong Outdoor Unit Model(s) ..... Your LG Manufacturer Representative
Installation, Startup, and Commissioning Technical Assistance 1-888-865-3026

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LG MONITORING VIEW (LGMV) DIAGNOSTIC SOFTWARE

LGMV software allows the service technician or commissioning agent to connect a computer USB port to the outdoor unit (ODU) main printed circuit board (PCB) using an accessory cable without the need for a separate interface device. The monitoring screen for LGMV allows the user to view the following real time data on one screen:

- Actual inverter compressor speed
- Target inverter compressor speed
- Actual superheat
- Target superheat
- Actual subcooler circuit superheat
- Target subcooler circuit superheat
- Main EEV position
- Subcooling EEV position
- Inverter compressor current transducer value
- Outdoor air temperature
- Actual high pressure/saturation temperature
- Actual low pressure/saturation temperature
- Suction temperature
- Inverter compressor discharge temperature
- Upper outdoor coil pipe temperature
- Lower outdoor coil pipe temperature
- Liquid line pipe temperature
- Subcooler inlet temperature
- Subcooler outlet temperature
- Four-way reversing valve operation indicator light
- Pressure graph showing actual low pressure and actual high pressure levels
- Error code display
- Operating mode indicator
- Target high pressure
- Target low pressure
- PCB (printed circuit board) version
- Software version
- Installer name
- Model number
- Site name
- Total number of connected IDUs
- Communication indicator
- IDU capacity
- IDU operating mode

Figure 72: MV Real-time Data Screen.

- IDU fan speed
- IDU EEV position
- IDU room temperature
- IDU inlet pipe temperature
- IDU outlet pipe temperature
- IDU error code

Additional screens can be accessed by tabs on the main screen. Additional screens include the following:

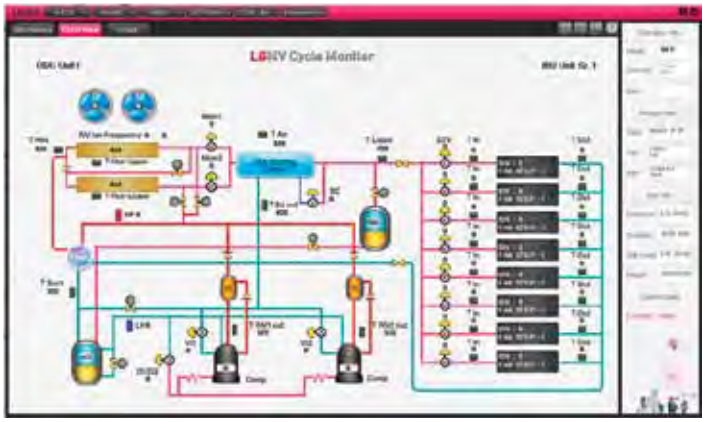
1. Cycleview: Graphic of internal components including:
   - Compressors showing actual speeds
   - EEVs
   - IDUs
   - Temperature and pressure sensors
   - Four-way reversing valve

2. Graph: Full screen graph of actual high and low pressures and high and low pressure limits. A sliding bar enables user to go back in time and view data.

3. Control FTN: Enables user to turn on IDUs in 1.8°F increments.

4. Useful Tab
   - Unit Conversion: Converts metric values to imperial values.

Figure 73: MV Cycleview.



⚠ Note:

Images on these pages are examples of LGMV screenshots. Actual images may differ depending on the version of the software and the units installed.

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LG MONITORING VIEW (LGMV) DIAGNOSTIC SOFTWARE

5. Data
   - Data Saving Start: Recording of real time data to a separate file created to be stored on the user's computer.
   - Data Loading Start: Recorded data from a saved ".CSV" file can be loaded to create an LGMV session.

6. Monitoring
   - Electrical: The lower half of main screen is changed to show Inverter Compressor Amps, Volts, Power Hz, Inverter control board fan Hz.

Figure 74: MV Control Indoor Units Screen.

Error Codes

LGMV software helps the service technician or commissioning agent to troubleshoot system operation issues by displaying malfunction codes. These error codes can be seen on the main screen of the LGMV software program. For an overview of Multi V IV error codes, see page 169. For detailed information on how to troubleshoot individual error codes, see the Multi V IV Service Manuals.

Figure 75: Error Code Screen.

The software is available in a high version with all of the features listed above. The low version has all features as the high version without Target High Pressure and Target Low Pressure values shown on main screen.

In lieu of connecting to the outdoor unit, the user has the option to connect to the indoor unit with the use of a USB to RS-485 connector kit. When connected through the indoor unit, however, the user will not be able to record data.

This software can be used to both commission new systems and troubleshoot existing systems. LGMV data can be recorded to a ".CSV" file and emailed to an LG representative to assist with diagnostic evaluations.

Recommended Minimum PC Configuration:

- CPU: Pentium® IV 1.6 GHz
- Main Memory: 1G
- Operating System: Windows® XP/Vista/7 32 bit (recommended), 64 bit
- Hard Disk: 600 MB when operating
- MS Office 2003, 2007 (recommended) for select reporting functions

⚠ Note:

Images on these pages are examples of LGMV screenshots. Actual images may differ depending on the version of the software and the units installed.

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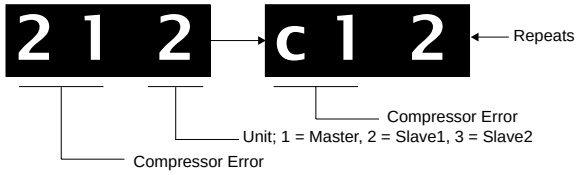
Error Codes

- Indicate different types of unit failures, assist in self-diagnosis and to track the frequency of occurrence.
- Error codes are shown on the LED of indoor units, wired remote controller, the outdoor unit control board, and on the main screen of the LG Monitoring View (LGMV) Diagnostic Software.
- If two or more errors occur simultaneously, the lower error code number is displayed first.
- After error is resolved, the error code does not display.



Error Display

The first, second, and third number on the LED indicates error number; the fourth number on LED indicates outdoor unit number.

Examples: 211 = Error No. 21 on master unit, 213 = Error No. 21 on slave2 unit, 21051 = Error No. 105 on master unit.

Error Code Nomenclature Definitions

- MICOM: Non-volatile memory chip where unit setup information is stored.
- EPROM: Non-volatile memory chip where device identification, size, and factory defined default component operating parameters are stored.

Table 57: Error Codes.

	Error Code			Description	Details
Indoor Unit	0	1	-	Indoor unit return air or optional remote wall temperature sensor communications error.	Indoor unit air temperature sensor has disconnected or short circuited. (Check the wiring, connection at the CN Room socket on the indoor unit PCB, then check the thermistor.)
	0	2	-	Indoor unit inlet pipe temperature sensor communication error.	Indoor unit inlet pipe temperature sensor has disconnected or short circuited. (Check the connection at the CN-PIPE/IN socket on the indoor unit PCB, then check the thermistor.)
	0	3	-	Communication error between zone controller and indoor unit.	Indoor unit PCB has not received communications signal from zone controller.
	0	4	-	Indoor unit drain pump error.	Drain pump and/or flow switch is/are malfunctioning. Also check drain line for obstructions.
	0	5	-	Communication error between outdoor unit and indoor unit.	• Indoor unit has not received communications signal from outdoor unit. • Check indoor unit to outdoor unit communication cable for issues (Check A terminals are connected to indoor unit A and 3 (5 on 3 x 3 cassette) terminals; B connect to B or 4 (6 on 3 x 3 cassette) terminals.
	0	6	-	Indoor unit outlet pipe temperature sensor error.	Indoor unit outlet pipe temperature sensor has disconnected or short circuited. (Check the connection at the CN-PIPE/OUT socket on the indoor unit PCB, then check the thermistor.)
	0	7	-	Indoor units are not operating in the same mode.	Different operation mode between indoor units.
	0	9	-	Indoor unit EPROM error.	• Communication error between the indoor unit PCB board and its option card. (The option card is about 1' x 1' and is plugged into the indoor unit PCB board. Check connection between the two.) • Communication error between EPROM chips on indoor unit main PCB. • Indoor unit EPROM data is not available.
	1	0	-	Indoor unit BLDC fan motor communications error.	• Fan motor has been removed or is defective. Use the OHM and voltage check charts in the product service manual. • The system has detected the fan motor is not spinning. • On new installs, verify installation manual and paperwork were removed from fan discharge shroud before unit was installed. • Check the wiring plug and connection at sockets CN-MOTOR1 and CN-MOTOR2 (if used).
Outdoor Unit	2	1	1	Master outdoor unit inverter compressor PCB error.	• Outdoor unit inverter compressor PCB error. • Under voltage • Refrigerant flow restriction from defective LEV. • Refrigerant charge is too high (overcharge).
	2	1	2	Slave1 outdoor unit inverter compressor PCB error.	
	2	1	3	Slave2 outdoor unit inverter compressor PCB error.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 58: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	2	2	1	Master outdoor unit inverter board input overcurrent (RMS) error.	• Overcurrent of outdoor unit inverter board PCB. • Under voltage • Refrigerant flow restriction from defective LEV. • Refrigerant charge is too high (overcharged).
	2	2	2	Slave1 outdoor unit inverter board input overcurrent (RMS) error.	
	2	2	3	Slave2 outdoor unit inverter board input overcurrent (RMS) error.	
	2	3	1	Low DC voltage sensed at the master outdoor unit inverter compressor DC link.	DC voltage failed to charge on power up. (Start diagnosis at the CN inverter socket on the outdoor unit noise filter PCB.)
	2	3	2	Low voltage to the slave1 outdoor unit inverter compressor DC link.	
	2	3	3	Low voltage to the slave2 outdoor unit inverter compressor DC link.	
	2	4	1	Master outdoor unit high pressure switch error.	System has been turned off by the master outdoor unit high pressure switch.
	2	4	2	Slave1 outdoor unit high pressure switch error.	System has been turned off by the slave1 outdoor unit high pressure switch.
	2	4	3	Slave2 outdoor unit high pressure switch error.	System has been turned off by the slave2 outdoor unit high pressure switch.
	2	5	1	Input voltage to the master outdoor unit is too high or too low.	Master outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤270V or ≥487V (for 460V units).
	2	5	2	Input voltage to the slave1 outdoor unit is too high or too low.	Slave1 outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤270V or ≥487V (for 460V units).
	2	5	3	Input voltage to the slave2 outdoor unit is too high or too low.	Slave2 outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤270V or ≥487V (for 460V units).
	2	6	1	Master outdoor unit inverter compressor operation error.	Initial operation failure due to outdoor unit inverter compressor problem.
	2	6	2	Slave1 outdoor unit inverter compressor operation error.	
	2	6	3	Slave2 outdoor unit inverter compressor operation error.	
	2	8	1	Master outdoor unit inverter DC link high voltage error.	Compressor shut off because outdoor unit inverter PCB DC link voltage is too high.
	2	8	2	Slave1 outdoor unit inverter DC link high voltage error.	
	2	8	3	Slave2 outdoor unit inverter DC link high voltage error.	
	2	9	1	Master outdoor unit inverter compressor overcurrent error.	Outdoor unit inverter compressor current draw is too high.
	2	9	2	Slave1 outdoor unit inverter compressor overcurrent error.	
	2	9	3	Slave2 outdoor unit inverter compressor overcurrent error.	
	3	2	1	Excessive increase in master outdoor unit inverter compressor1 gas discharge temperature.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	2	2	Excessive increase in slave1 outdoor unit inverter compressor1 gas discharge temperature.	
	3	2	3	Excessive increase in slave2 outdoor unit inverter compressor1 gas discharge temperature.	
	3	3	1	Excessive increase in master outdoor unit inverter compressor2 gas discharge temperature.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	3	2	Excessive increase in slave1 outdoor unit inverter compressor2 gas discharge temperature.	
	3	3	3	Excessive increase in slave2 outdoor unit inverter compressor2 gas discharge temperature.	
	3	4	1	Master outdoor unit compressor high pressure safety tripped.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	4	2	Slave1 outdoor unit compressor high pressure safety tripped.	
	3	4	3	Slave2 outdoor unit compressor high pressure safety tripped.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 59: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	3	5	1	Master outdoor unit low side pressure transducer senses pressure below allowable limits.	• Shutdown due to low suction pressure.
	3	5	2	Slave1 outdoor unit low side pressure transducer senses pressure below allowable limits.	
	3	5	3	Slave1 outdoor unit low side pressure transducer senses pressure below allowable limits.	
	3	6	1	Master outdoor unit fell below low condenser (compression) ratio limit.	Master outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	3	6	2	Slave1 outdoor unit fell below low condenser (compression) ratio limit.	Slave1 outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	3	6	3	Slave2 outdoor unit fell below low condenser ratio limit.	Slave2 outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	4	0	1	Master outdoor unit inverter compressor current transducer (CT) sensor error.	Outdoor unit inverter compressor current transducer (CT)detection sensor has disconnected or short circuited.
	4	0	2	Slave1 outdoor unit inverter compressor current transducer (CT) sensor error.	
	4	0	3	Slave2 outdoor unit inverter compressor current transducer (CT) sensor error.	
	4	1	1	Master outdoor unit inverter compressor1 discharge pipe temperature sensor error.	• Check the connection at the CN-34 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	1	2	Slave1 outdoor unit inverter compressor1 discharge pipe temperature sensor error.	
	4	1	3	Slave2 outdoor unit inverter compressor1 discharge pipe temperature sensor error.	
	4	2	1	Master outdoor unit low pressure transducer error.	• Check the connection at the CN-30 socket on the outdoor unit PCB. • Transducer has disconnected or short circuited.
	4	2	2	Slave1 outdoor unit low pressure transducer error.	
	4	2	3	Slave2 outdoor unit low pressure transducer error.	
	4	3	1	Master outdoor unit high pressure transducer error.	• Check the connection at the CN-31 socket on the outdoor unit PCB. • Transducer has disconnected or short circuited.
	4	3	2	Slave1 outdoor unit high pressure transducer error.	
	4	3	3	Slave2 outdoor unit high pressure transducer error.	
	4	4	1	Master outdoor unit ambient temperature sensor error.	• Check the connection at the CN-33 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	4	2	Slave1 outdoor unit ambient temperature sensor error.	
	4	4	3	Slave2 outdoor unit ambient temperature sensor error.	
	4	5	1	Master outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	• Check suction sensor in cooling mode; check hot gas sensor located near the heat exchanger in heating mode. • Check the connection at the CN-34 socket, connector tag TH_HEX2, on the outdoor unit PCB, then check if thermistor is open or shorted. • Thermistor has disconnected or short circuited.
	4	5	2	Slave1 outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	
	4	5	3	Slave2 outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	
	4	6	1	Master outdoor unit suction pipe temperature sensor error.	• Check the connection at the CN-34 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	6	2	Slave1 outdoor unit suction pipe temperature sensor error.	
	4	6	3	Slave2 outdoor unit suction pipe temperature sensor error.	
	4	7	1	Master outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of master outdoor unit inverter compressor2 discharge temperature sensor.
	4	7	2	Slave1 outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit inverter compressor2 discharge temperature sensor.
	4	7	3	Slave2 outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit inverter compressor2 discharge temperature sensor.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 60: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	4	9	1	Master outdoor unit IPM temperature sensor error.	Disconnection or short circuit of master outdoor unit IPM temperature sensor.
	4	9	2	Slave1 outdoor unit IPM temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit IPM temperature sensor.
	4	9	3	Slave2 outdoor unit IPM temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit IPM temperature sensor.
	5	0	1	Master outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the master outdoor unit.
	5	0	2	Slave1 outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the slave1 outdoor unit.
	5	0	3	Slave2 outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the slave2 outdoor unit.
	5	1	1	Combination ratio is out of range.	The total of the nominal indoor unit capacity is less than 50% or more than 130% of the nominal outdoor unit capacity.
	5	1	2	Total indoor unit capacity exceeds allowable heat recovery unit branch capacity. (Heat Recovery Systems only.)	Value of total indoor unit capacity exceeds allowable heat recovery unit branch capacity specifications. (Heat Recovery Systems only.)
	5	2	1	Communication error between master outdoor unit main PCB and inverter PCB.	• Communication error between main PCB (CN-29) and inverter PCB CN-MAIN (COM/RD). • Check connections at both sockets. • Inspect interconnecting cable for wear.
	5	2	2	Communication error between slave1 outdoor unit main PCB and inverter PCB.	
	5	2	3	Communication error between slave2 outdoor unit main PCB and inverter PCB.	
	5	3	1	Communication error between outdoor unit main PCB and indoor unit(s) PCB.	• Check if outdoor unit to indoor unit(s) communications cable has disconnected or short circuited. • Check A terminals are connected to indoor unit A and 3 (5 on 3 x 3 cassette) terminals; B connect to B or 4 (6 on 3 x 3 cassette) terminals.
	5	4	1	Master outdoor unit power error.	Master outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	4	2	Slave1 outdoor unit power error.	Slave1 outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	4	3	Slave2 outdoor unit power error.	Slave2 outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	7	1	Master outdoor unit main PCB and inverter PCB communication error.	Master outdoor unit inverter PCB is not receiving signal from main PCB.
	5	7	2	Slave1 outdoor unit main PCB and inverter PCB communication error.	Slave1 outdoor unit inverter PCB is not receiving signal from main PCB.
	5	7	3	Slave2 outdoor unit main PCB and inverter PCB communication error.	Slave2 outdoor unit inverter PCB is not receiving signal from main PCB.
	5	9	1	Outdoor unit series installation error.	A smaller outdoor unit is set as the master outdoor unit.
	6	0	1	Master outdoor unit inverter PCB EPROM error.	• Verify the EPROM is present and in the socket correctly. • Check if all pins are in and are not bent. • Check if notch in the chip lines up with the arrow on the socket.
	6	0	2	Slave1 outdoor unit inverter PCB EPROM error.	
	6	0	3	Slave2 outdoor unit inverter PCB EPROM error.	
	6	2	1	High temperature at the master outdoor unit inverter heatsink.	System shut off because of high temperatures at the master outdoor unit inverter heatsink.
	6	2	2	High temperature at the slave1 outdoor unit inverter heatsink.	System shut off because of high temperatures at the slave1 outdoor unit inverter heatsink.
	6	2	3	High temperature at the slave2 outdoor unit inverter heatsink.	System shut off because of high temperatures at the slave2 outdoor unit inverter heatsink.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 61: Error Codes, continued.

Error Code					Description	Details
Outdoor Unit	6	5	1		Master outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of master outdoor unit inverter heatsink temperature sensor.
	6	5	2		Slave1 outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit inverter heatsink temperature sensor.
	6	5	3		Slave2 outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit inverter heatsink temperature sensor.
	6	7	1		Master outdoor unit fan has locked up.	Master outdoor unit air flow is restricted.
	6	7	2		Slave1 outdoor unit fan has locked up.	Slave1 outdoor unit air flow is restricted.
	6	7	3		Slave2 outdoor unit fan has locked up	Slave2 outdoor unit air flow is restricted.
	7	1	1		Master outdoor unit converter CT sensor error.	Master outdoor unit is restricted.
	7	1	2		Slave1 outdoor unit converter CT sensor error.	Slave1 outdoor unit is restricted.
	7	1	3		Slave2 outdoor unit converter CT sensor error.	Slave2 outdoor unit is restricted.
	7	5	1		Master outdoor unit fan CT sensor error.	Disconnection or short circuit of master outdoor unit fan current detection (CT) sensor.
	7	5	2		Slave1 outdoor unit fan CT sensor error.	Disconnection or short circuit of slave1 outdoor unit fan current detection (CT) sensor.
	7	5	3		Slave2 outdoor unit fan CT sensor error.	Disconnection or short circuit of slave2 outdoor unit fan current detection (CT) sensor.
	7	6	1		Master outdoor unit fan DC link high voltage error.	Master outdoor unit fan DC link high voltage error.
	7	6	2		Slave1 outdoor unit fan DC link high voltage error.	Slave1 outdoor unit fan DC link high voltage error.
	7	6	3		Slave2 outdoor unit fan DC link high voltage error.	Slave2 outdoor unit fan DC link high voltage error.
	7	7	1		Master outdoor unit fan overcurrent error.	Master outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	7	2		Slave1 outdoor unit fan overcurrent error.	Slave1 outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	7	3		Slave2 outdoor unit fan overcurrent error.	Slave2 outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	9	1		Master outdoor unit fan operation failure error.	Master outdoor unit fan is experiencing first position sensor failure.
	7	9	2		Slave1 outdoor unit fan operation failure error.	Slave1 outdoor unit fan is experiencing first position sensor failure.
	7	9	3		Slave2 outdoor unit fan operation failure error.	Slave2 outdoor unit fan is experiencing first position sensor failure.
	8	6	1		Master outdoor unit main PCB onboard EPROM error.	• Verify the EPROM is present and in the socket correctly. • Check if all pins are in and are not bent. • Check if notch in the chip lines up with the arrow on the socket.
	8	6	2		Slave1 outdoor unit main PCB onboard EPROM error.	
	8	6	3		Slave2 outdoor unit main PCB onboard EPROM error.	
	8	7	1		Master outdoor unit fan PCB EPROM error.	• Communication error between master outdoor unit fan MICOM and EPROM. • EPROM is missing.
	8	7	2		Slave1 outdoor unit fan PCB EPROM error.	• Communication error between slave1 outdoor unit fan MICOM and EPROM. • EPROM is missing.
	8	7	3		Slave2 outdoor unit fan PCB EPROM error.	• Communication error between slave2 outdoor unit fan MICOM and EPROM. • EPROM is missing.
	1	0	4	1	Communication error between master outdoor unit and slave outdoor units.	Master outdoor unit main PCB is not receiving signals from slave outdoor units.
	1	0	4	2	Communication error between slave1 outdoor unit and master and slave2 outdoor units.	Slave1 outdoor unit main PCB is not receiving signals from master and slave2 outdoor units.
	1	0	4	3	Communication error between slave2 outdoor unit and master and slave1 outdoor units.	Slave2 outdoor unit main PCB is not receiving signals from master and slave1 outdoor units.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 62: Error Codes, continued.

Error Code					Description	Details
Outdoor Unit	1	0	5	1	Master outdoor unit fan PCB communication error.	Master outdoor unit main PCB is not receiving a signal from the fan.
	1	0	5	2	Slave1 outdoor unit fan PCB communication error.	Slave1 outdoor unit main PCB is not receiving a signal from the fan.
	1	0	5	3	Slave2 outdoor unit fan PCB communication error.	Slave2 outdoor unit main PCB is not receiving a signal from the fan.
	1	0	6	1	Master outdoor unit fan IPM error.	Instant overcurrent (peak) of master outdoor unit fan IPM.
	1	0	6	2	Slave1 outdoor unit fan IPM error.	Instant overcurrent (peak) of slave1 outdoor unit fan IPM.
	1	0	6	3	Slave2 outdoor unit fan IPM error.	Instant overcurrent (peak) of slave2 outdoor unit fan IPM.
	1	0	7	1	Master outdoor unit fan DC link low voltage error.	Master outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	0	7	2	Slave1 outdoor unit fan DC link low voltage error.	Slave1 outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	0	7	3	Slave2 outdoor unit fan DC link low voltage error.	Slave2 outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	1	3	1	Master outdoor unit liquid pipe temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	3	2	Slave1 outdoor unit liquid pipe temperature sensor error.	
	1	1	3	3	Slave2 outdoor unit liquid pipe temperature sensor error.	
	1	1	4	1	Master outdoor unit subcooling inlet temperature sensor error.	• Check the connection at the CN-35 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	4	2	Slave1 outdoor unit subcooling inlet temperature sensor error.	
	1	1	4	3	Slave2 outdoor unit subcooling inlet temperature sensor error.	
	1	1	5	1	Master outdoor unit subcooling outlet temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	5	2	Slave1 outdoor unit subcooling outlet temperature sensor error.	
	1	1	5	3	Slave2 outdoor unit subcooling outlet temperature sensor error.	
	1	1	6	1	Master outdoor unit oil level sensor error.	Disconnection or short circuit of master outdoor unit oil level sensor.
	1	1	6	2	Slave1 outdoor unit oil level sensor error.	Disconnection or short circuit of slave1 outdoor unit oil level sensor.
	1	1	6	3	Slave2 outdoor unit oil level sensor error.	Disconnection or short circuit of slave2 outdoor unit oil level sensor.
	1	4	5	1	Communication error between master outdoor unit main board and external board.	Master outdoor unit main board to external board communication failure.
	1	4	5	2	Communication error between slave1 outdoor unit main board and external board.	Slave1 outdoor unit main board to external board communication failure.
	1	4	5	3	Communication error between slave2 outdoor unit main board and external board.	Slave2 outdoor unit main board to external board communication failure.
	1	5	1	1	Master outdoor unit operation mode conversion error.	Pressure imbalance between outdoor units.
	1	5	1	2	Slave1 outdoor unit operation mode conversion error.	
	1	5	1	3	Slave2 outdoor unit operation mode conversion error.	
	1	5	3	1	Master outdoor unit upper heat exchanger temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	5	3	2	Slave1 outdoor unit upper heat exchanger temperature sensor error.	
	1	5	3	3	Slave2 outdoor unit upper heat exchanger temperature sensor error.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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Table 63: Error Codes, continued.

	Error Code				Description	Details
Outdoor Unit	1	5	4	1	Master outdoor unit lower heat exchanger temperature sensor error.	• Check the connection at the CN-35 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	5	4	2	Slave1 outdoor unit lower heat exchanger temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit lower heat exchanger temperature sensor.
	1	5	4	3	Slave2 outdoor unit lower heat exchanger temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit lower heat exchanger temperature sensor.
	1	8	2	1	Communication error between master outdoor unit external board main and sub MICOMs.	Master outdoor unit external board main to sub MICOMs communication failure.
	1	8	2	2	Communication error between slave1 outdoor unit external board main and sub MICOMs.	Slave1 outdoor unit external board main to sub MICOMs communication failure.
	1	8	2	3	Communication error between slave2 outdoor unit external board main and sub MICOMs.	Slave2 outdoor unit external board main to sub MICOMs communication failure.
	1	9	3	1	Excessive increase in master outdoor unit fan heatsink temperature.	System has shut off because master outdoor unit fan heatsink temperature is >203°F.
	1	9	3	2	Excessive increase in slave1 outdoor unit fan heatsink temperature.	System has shut off because slave1 outdoor unit fan heatsink temperature is >203°F.
	1	9	3	3	Excessive increase in slave2 outdoor unit fan heatsink temperature.	System has shut off because slave1 outdoor unit fan heatsink temperature is >203°F.
	1	9	4	1	Master outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of master outdoor unit fan heatsink temperature sensor.
	1	9	4	2	Slave1 outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit fan heatsink temperature sensor.
	1	9	4	3	Slave2 outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit fan heatsink temperature sensor.
Heat Recovery Unit	2	0	0	1	Valve addressing error.	Automatic valve addressing procedure failed.
	2	0	1	C + No. of HR Unit	Heat recovery unit liquid sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit liquid pipe sensor.
	2	0	2	C + No. of HR Unit	Heat recovery unit subcooling pipe inlet sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit subcooling pipe inlet sensor.
	2	0	3	C + No. of HR Unit	Heat recovery unit subcooling pipe outlet sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit subcooling pipe outlet sensor.
	2	0	4	C + No. of HR Unit	Communication error between outdoor unit and heat recovery unit. (C = Heat recovery unit + Heat recovery unit number)	Outdoor unit does not receive signal from heat recovery unit.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manuals on www.lg-vrf.com.

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LG Multi V Pre-Commissioning Device Configuration Worksheet

Project Name:	**Building ID**
Date: AC Smart Static IP address:	**System ID** **Page #**
Mech Contractor Company Name	**MEP Project Mngr Name**
Pre-Com Tech Name/Ph#/email	**Ph# / Email**

IDU's

Unit Tag	Building Floor	Room ID	Type	Model	Serial #	Adjusted Fan Setting Value . Low | Medium | High			System Address	Central Control Address	Group member ID or N/A if not in a group	Group Function M=Master S=Slave	Sensor Strategy (RA/ZC/Both)

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INSTALLATION CHECKLIST

Major Component Rough-In

Description	Check
All Multi V outdoor units are connected properly per local code and the product installation procedures.	
All literature and bagged accessories have been removed from the fan discharge (ducted and cassette model indoor units).	
All Indoor units and heat recovery units (for Heat Recovery systems only) are installed, properly supported, and located indoors in a non-corrosive environment.	
Duct work installation completed (ducted indoor units only).	
Outdoor unit's gravity condensate drain line is connected and routed where it properly drained away or, if installed in a mechanical room, is connected and properly routed to a drain terminal.	

Piping and Insulation

Description	Check
Copper	
Over 5/8 inches—Rigid ACR only.	
5/8 inches and under—Can use soft ACR.	
15% silver brazing material only.	
All refrigerant pipes and valves are insulated separately. Insulation butts up against the walls of the indoor units and heat recovery units (for Heat Recovery systems only). No gaps or cracks. Insulation was not compressed at clamps and hangers.	
LG Y-branch fittings or headers were used as per LATS Multi V report.	
(Optional) Full port ball valves for all indoor units. (Schrader between the valve body and the indoor units.)	

Brazing Practices

Description	Check
Use medical grade (there are 4 available) dry nitrogen for purging during brazing (constant 3 psi while brazing).	
Minimum 3/4", maximum 1" condensate piping installed on indoor units–material used is acceptable under local code. Insulated as necessary to prevent condensation.	

Installation

(For more information on any procedure, refer to the detail provided in the Multi V Outdoor and Indoor Unit Installation Manuals.)

Refrigerant Piping

Description	Check
You must have in your possession a copy of the "As-Designed" LATS Multi V piping tree diagram. BEFORE ANY FIELD PIPE SIZE OR LENGTH CHANGES ARE MADE, PROPOSED CHANGES MUST BE FORWARDED TO THE DESIGN ENGINEER SO THAT THEY CAN INPUT THE CHANGES INTO LATS and RE-ISSUE A NEW LATS MULTI V PIPING TREE DIAGRAM. Installer must receive change authorization from the design engineer, because any change made requires the review of the entire tree diagram and verification that the change did not impact the size of piping segments in other parts of the system.	
All pipe materials were properly stored, capped, and clean. All burrs were removed after cutting and pipe ends were reamed before brazing.	
During refrigerant pipe installation, for each segment of pipe, a record was made of the pipe length (including expansion loops, offsets, double-back sections), and sizes, as well as the quantity and type of elbows used.	
All long runs of straight pipe were provided with expansion loops.	
Insure Y-branch fittings are installed with no more than ±10° of horizontal.	
Insure Y-branch fittings are installed with no more than ±3° of vertical.	
Insure all Header fittings are installed horizontal at an elevation above all connected indoor units.	
A torque wrench and backup wrench were used to tighten all flare connections.	
The back side of all flares were lubricated with a small drop of PVE refrigeration oil before tightening flare fittings.	
Insure all field made flares are 45°. Use factory-supplied flare nuts only.	
All pipe segments were properly supported and all wall penetrations were sleeved.	
All pipe insulation is not compressed at any point.	
Y-branch and headers fittings were properly supported per details provided in the Multi V IV Outdoor Unit Installation Manual.	
Insure Y-branch fittings are installed in the correct direction. Flow is always from the single end to the double end.	
No oil traps, solenoid valves, sight glasses, filter driers, or any other unauthorized refrigerant specialities are present.	
(Optional) High quality R410A rated full port ball valves with a Schrader port were used at all indoor units and at will in the refrigerant piping network. (Recommended for serviceability.)	
Best practice includes a minimum of 20" of straight pipe was installed between each elbow, and Y-branch or header fitting, and between two Y-branch fittings.	

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MULTI V IV

INSTALLATION CHECKLIST

LG

Heat Recovery Unit

Description	Check
Heat Recovery Unit is installed properly cannot be installed upsidedown or any angle, top up and level.	
Piping is insulated properly per the design engineer's specifications. Insulation lines butt the housing of the Heat Recovery Unit.	
DIP switches and rotary dial settings are correct.	
If large capacity indoor unit, a Y-branch is installed properly.	

Condensate Pump / Drain Installation

Description	Check
Indoor unit condensate drain pipes were installed correctly.	
All condensate vertical risers are equal to or less than 27-1/2" from the bottom of the indoor unit.	
Indoor units with condensate pumps were level. Units with gravity drains were level or slightly canted toward the drain connection and are supported properly.	
Pumped condensate drain lines were properly connected (do not have traps, and connect to the top surface of the main drain line).	

Power Wire and Communications Cables

Description	Check
Power wiring was connected to a three phase 208-230V source or three phase 460V (verify system electrical requirements).	
Ground wire was installed and properly terminated at the outdoor unit(s).	
The power supplied was clean with voltage fluctuations within specifications. (±10% of nameplate).	
Power wiring to the outdoor unit(s) was installed per all local electrical code requirements.	
Power wiring to each indoor unit was installed per all local electrical code requirements.	
Communications cable between the outdoor unit(s) and indoor units was connected in a daisy chain configuration (i.e., single parallel chain). No "Star" or multiple parallel circuits. No cable splices or wire caps were used to connect communications cables.	
LG-supplied cable was used between each indoor unit and its zone controller. No cables were spliced and no wire caps are present.	
Communication type RS-485–BUS type.	
All communications cables are a minimum of 18-Gauge, two conductor, stranded, with insulation material per local code. Cable segment shields were tied together. Cable shield is grounded at the Master outdoor unit only.	
Use appropriate crimping tool to attach ring or spade terminals at all power wiring and control cable terminations.	
Verify all ring and spade terminals are copper bearing in all communications daisy chains. Galvanized or nickel plated steel connectors were not used.	
All power and control wires were properly separated using the recommended distance provided in the product installation manual.	
Only LG-supplied Y-cables and extension cables were used between indoor units.	

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MULTI V IV PRE-COMMISSIONING CHECKLIST

Job Name / Location _____ Tag # _____

Date: _____

Address: _____

_____

Refrigerant Circuit Preparation

Description	Check
Using a copy of the LATS Multi V pipe design diagram, verify the sum of the indoor unit nominal capacity connected to the piping system is between 50% and 130% of the outdoor unit's(s') nominal capacity. If this rule is violated, the system will not start.	
Check all indoor units for power at the unit disconnect and power is present at the indoor unit PCB board. (LED is lit.) DO NOT TURN ON THE UNIT using the ON/OFF button.	
Successful auto address routine is complete. All device addresses have been recorded on the Indoor Unit Device Configuration Worksheet.	
Insure all field-installed full-port ball valves are open.	
The piping system held a constant 550 psig pressure for a minimum of 24 hours with all isolation valves open.	
A triple system evacuation has been performed. Micron gauge reading held at a minimum of 500 for 24 hours with all isolation valves open and without the vacuum pump connected.	
Power was energized to the outdoor unit(s) at _____(time) on _____day to power the compressor crankcase heater(s). (Must be at least 6 hours before commissioning.)	
The communications cable to the indoor units has been disconnected from the IDU (B) and IDU (A) terminals at the outdoor unit(s).	
None of the outdoor unit(s) service valves have been opened during the installation and preparation of the system for commissioning. (If the valves were opened, the factory refrigerant charge has been released.)	

Prepare Pre-commissioning Package Documents

Include	Check
1. A copy of the refrigerant piping system(s) shop drawing(s) generated by LATS Multi V pipe design software.	
2. A copy of the pipe fitter's pipe changes and field notes.	
3. A verified copy of the "As-Built" LATS Multi V Project file (*.mtv) that includes all changes noted by the pipe fitter(s) in Number 2. The tree diagram notes should include changes to the line lengths used for each liquid line segment	
4. A copy of a completed and verified Installation Checklist for the outdoor unit(s), indoor units, ERVs, heat recovery unit (for Heat Recovery systems only) Air Cleaners, and Control Devices. Correct any procedures needing attention before initiating a request for commissioning..	
5. A copy of the air balance report showing proper airflow at all indoor units.	
6. A completed Pre-commissioning Device Configuration Worksheet.	
7. A completed copy of the Pre-commissioning Checklist.	
8. If available, a list of IP addresses obtained from the building owners IT department for each ACP, BacNet, LonWorks, AC Smart II, AC Smart Premium devices.	

Initiate a Commissioning Request

Description	Check
Verify this checklist and requirements herein have been met. Complete this checklist in its entirety BEFORE initiating a request for Commissioning..	
Send all Pre-commissioning Package Documents to your LG Applied Representative.	

Contractor Name: _____ _____

(Authorized Signature)

Address: _____

_____

Phone: _____ Date: _____

**This form must be completed and submitted to LG a minimum of three (3) weeks prior to final scheduling of any startup.*
Note: If any of the above items are not complete at time of start-up, back charges will be assessed for additional costs.

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MULTI V IV REFRIGERANT CHARGE WORKSHEET

LG

⚠ Note:

The system will stop operation due to excessive or insufficient refrigerant, therefore, always charge the unit properly. When servicing, always refer to any notes about system piping length and additional refrigerant amounts.

System Refrigerant Charge Calculator (lbs.).

System Tag or ID_____	Job Name_____ Project Manager_____ Date_____

Line #	Description	Chassis I.D.	Size	Quantity	CF (Ref.)[1]	Total (lbs.)
1	Linear feet of 1/4" liquid line tubing[2]	—	—		0.015	
2	Linear feet of 3/8" liquid line tubing[2]	—	—		0.041	
3	Linear feet of 1/2" liquid line tubing[2]	—	—		0.079	
4	Linear feet of 5/8" liquid line tubing[2]	—	—		0.116	
5	Linear feet of 3/4" liquid line tubing[2]	—	—		0.179	
6	Linear feet of 7/8" liquid line tubing[2]	—	—		0.238	
7	Linear feet of 1" liquid line tubing[2]	—	—		0.323	
8	Wall Mounted + Art Cool Mirror	SE	7k to 15k		0.53	
9	Wall Mounted + Art Cool Mirror	S8, S5	18k to 24k		0.62	
10	1-Way Cassette	TJ	7k to 12k		0.44	
11	2-Way Cassette	TL	18k to 24k		0.35	
12	4-Way 2' x 2' Cassette	TR	5k to 7k		0.40	
13	4-Way 2' x 2' Cassette	TR	9k to 12k		0.55	
14	4-Way 2' x 2' Cassette	TQ	15k to 18k		0.71	
15	4-Way 3' x 3' Cassette	TN	9k to 15k		1.06	
16	4-Way 3' x 3' Cassette	TM	18k to 24k		1.41	
17	4-Way 3' x 3' Cassette	TP	24k to 28k		1.06	
18	4-Way 3' x 3' Cassette	TN	36k		1.41	
19	4-Way 3' x 3' Cassette	TM	42k to 48k		1.41	
20	High Static Ducted	BH	7k to 24k		0.57	
21	High Static Ducted	BG	15k to 42k		0.97	
22	High Static Ducted	BR	48k to 54k		1.37	
23	High Static Ducted	B8	76k to 95k		2.20	
24	Low Static Ducted, Low Static Ducted Bottom Return	B1, B3	7k to 15k		0.37	
25	Low Static Ducted, Low Static Ducted Bottom Return	B2, B4	18k to 24k		0.82	
26	Vertical / Horizontal Air Handling Unit	NJ	12k to 24k		1.04	
27	Vertical / Horizontal Air Handling Unit	NJ	30k		1.04	
28	Vertical / Horizontal Air Handling Unit	NJ	36k		1.57	
29	Vertical / Horizontal Air Handling Unit	NK	42k to 54k		2.00	
30	Ceiling Suspended	VJ	18k to 24k		0.77	
31	Convertible Surface Mount—Ceiling/Wall	VE	9k to 12k		0.22	
32	Floor Standing	CE (U)	7k to 15k		0.37	
33	Floor Standing	CF (U)	18k to 24k		0.82	
34	PRHR021A, PRHR031A, PRHR041A	—	—	—	1.1	
35	Additional Refrigerant Charge Required					
36a-e	Outdoor Unit Factory Refrigerant Charge (To obtain factory refrigerant charge for each frame, see the Multi V IV Engineering Manual or Installation Specification Tables.	36a ARU*072***4	72k		16.9	
		36b ARU*096***4	96k		23.6	
		36c ARU*121***4	121k		23.6	
		36d ARU*144***4	144k		23.6	
		36e ARU*168***4	168K		23.6	
37	Total Factory Refrigerant Charge (sum of refrig. charge for all Outdoor Units in the system)					
38	Total System Charge: Sum of Additional Refrigerant Charge Required and Total Factory Refrigerant Charge					

[1]CF (Ref.) = Correction Factor for Refrigerant Charge.

[2]For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

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Table 64: Maintenance Recommendations.

Component	Maintenance	Occurrence (Minimum)
Indoor Units	Wash filters	On a regular basis / as needed
	Clean coils	Once a year
	Clean / check condensate pan	Once a year
Outdoor Unit(s)	Clean coils	Once or twice a year
	Clean / check condensate pan	Once or twice a year
Communications Cable and Power Wiring	Verify that all cables and wiring are properly connected	Once or twice a year

⚠ Note:

It is also recommended to monitor system operation using LGMV Software at least once a year.

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